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Technology Transfer from Foreign Firms to Local Suppliers through Backward Linkages in Jordan

Taher Ata Alkhatatneh

**A Thesis Submitted to the University of Huddersfield in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy**

The University of Huddersfield

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Abstract

This study is an attempt to understand the phenomenon of technology transfer. The study examines the extent of technology transfer from foreign firms to their local suppliers in Jordan, and also investigates the factors that affect the extent of technology transfer. In this study, an effort was made to provide a better understanding of the mechanisms of technology transfer to local suppliers, how foreign manufacturing companies are supporting their local suppliers, and what types of assistance are provided to local suppliers. Furthermore, this study has explored the obstacles to the formation of backward linkages with local firms.

These findings are based on an administrated questionnaire to a sample of 223 foreign firms operating in Jordan and semi-structured interviews conducted with purchasing managers. A total of 93 usable responses were collected, a response rate of 51%. For the purpose of data analysis the study utilises descriptive statistics and multivariate statistics (i.e. multiple regression and correlation analysis).

The results show that the overall level of backward linkages and technology transfer is low. A number of factors affect this transfer, including market orientation, experience of the firm in host country, ownership structure, size of firms, the level of autonomy granted to firms, origin of firms, and geographical proximity. There is a significant relationship between types of industries and the extent of technology transfer. In addition, the findings reveal that most obstacles to the formation of backward linkages with local firms are the lack of local inputs and the poor quality of the locally available inputs; in particular, the specialised intermediates and components.

A distinguishing feature of this study is that it extends previous studies in understanding the phenomenon of technology transfer and the factors that affect this transfer. The results suggest that creation of backward linkages and transfer of technology requires the availability of local suppliers with good quality, sufficient quantity, and competitive cost compared to their previous suppliers. This finding, therefore, raises implications for future technology transfer researchers and, by drawing off backward linkages and technology transfer literature, overcomes some of the deficiencies of previous research relating to backward linkages and technology transfer.

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Chapter One

Introduction

1.1 Introduction

This chapter aims to explain the rationale for conducting this study and to provide a general introduction to the thesis. Section 1.2 provides a background to the study and the motivation for undertaking it. Section 1.3 presents the research questions. Section 1.4 presents the research aim and objectives. Section 1.5 presents the research methodology. Section 1.6 highlights the contribution of the current study. Finally, Section 1.7 presents the structure of the thesis.

1.2 Background to the study

The macroeconomic impact of Foreign Direct Investment (FDI) on economic growth, employment, and exports has been widely discussed for a number of years. The European Commission defined FDI as “the establishment or acquisitions of income-generating assets in a foreign country over which the investing firm has control” (Harrison et al., 2000, p.251). The impact of Multinational Corporations (MNCs) on host countries has been studied carefully in the previous literature. At the microeconomic level linkages with local firms have recently attracted increasing attention from scholars and policy makers due to the role they play in the development of host countries; in particular, by supporting the local supply industries and transferring knowledge to local suppliers (Giroud, 2007). As Giroud (2007) indicated, this support could lead to an upgrading of suppliers through linkages and related technology transfer. Thus, this research focuses on the technological impact of MNCs in Jordan. However, since there are many potential channels for the transfer of technology from MNCs to local firms, such as forward and backward linkages between foreign firms and local firms, employees’ mobility from multinationals to local firms and through demonstration effects (Blomstrom and Kokko, 1997; Blomstrom et al, 2000), this research focuses on the transfer of technology from MNCs to their local suppliers through backward linkages.

As a result of these potential positive impacts, great emphasis has been placed by the researchers on highlighting the benefits of MNCs in these countries; the backward linkages have been identified as a particularly important channel through which domestic firms benefit from FDI. Realisation of this and other benefits arising from FDI has prompted governments to encourage FDI inflows, which has led to increasing competition between countries to encourage the inflow of FDI to their countries (UNCTAD, 1999; Chakrabarti, 2003). The two common types of linkages created are vertical and horizontal (Dunning, 1993; Blomstrom et al., 2000; Caves, 1996; UNCTAD, 2001; Giroud, 2007). Vertical linkages represent the relations established with suppliers and customers firms in the host economy. Backward linkages refer to the relations established with firm's suppliers, whereas forward linkages refer to relations established with firm's customers in the host economy (Giroud, 2003).

FDI generates two opposite effects on the intensity of linkages. On the one hand, the entry of MNCs creates a new demand for the suppliers of raw material, processed material, and intermediate goods. On the other hand, it will increase competition in the host economy, and thus could force some of the local firms to exit the market or to cut back on their output. Therefore, the net effect of foreign firms will depend on the linkages they generate compared to the ones that would be generated by the local firms displaced from the market (Jabbou and Mucchielli, 2007).

A review of the transfer of technology literature highlights the importance of backward linkages as a channel for technology transfer. The formation of backward linkages plays a critical role on employment generation and reducing unemployment; there is also a package of potential positive impacts on host country when MNCs establish a subsidiary overseas, such as employment generation, financial, technological, and managerial impacts that together have far-reaching implications for the host economy, especially for the developing countries (Dicken, 2003). Therefore, most countries have removed their barriers to FDI and have made substantial efforts to attract foreign investors. This change in attitude is due to realisation of the role that FDI can play in economic development.

As technological change becomes more rapid and pervasive, its impact affects most activities in developing country's manufacturing and service industries. Due to its increasing role as a driving force behind economic growth, this makes it crucial for every country to raise its abilities to access and deploy such technologies to support economic progress and growth. Thus, governments are, willingly or otherwise, liberalising economic policies (Lall, 2002).

Most of the developing countries tend to suffer from shortages of firms' capability to provide groundbreaking scientific knowledge which would allow them to compete in the international marketplace. This lack of technology is frequently the obstacle behind further economic progress and growth. When Multinational Corporations (MNCs) make FDI in developing countries, they provide them with possibilities for accessing this much-required technology. Thus, a great concern for today's policy makers is how to best exploit the intangible assets possessed by MNCs for the benefit of a host economy. The impetus behind this research therefore, derives first from the increasing importance of technology and the important role that technology plays in economic progress and growth. As Lall (2002) emphasises, economic growth is widely generated by technological change and to a great extent by integrated production systems across firms and regions. Second, the shortages of studies in Jordan and the importance of technology for the development of host countries have provided the motivation for conducting the current research.

The econometric literature presents unenthusiastic results concerning the extent of technology transfer to local firms. Most of the previous research finds negative or non-significant correlation between foreign presence and the productivity of local firms. The common explanation for these findings is the lack of absorptive capacity of the local firms. Further, the absence of transfer to local firms could be due to the fact that the diffusion of MNCs' technology and know-how to their local competitors is not in the strategic interest of foreign affiliates, particularly when the technological superiority of the foreign affiliates is the main sources of their competitive advantage in the host country. Technology transfer will increase the productivity of their local competitors, and

they may have an incentive to transfer technologies or business practices, such as quality control processes or inventory management techniques to their suppliers, as this transfer leads to an increase in the quality and a decrease in the price of their local suppliers' products (Javorcik, 2004; Jabbour and Mucchielli, 2007). Therefore, taking this fact into consideration, backward linkages between foreign affiliates and domestic suppliers may be one of the most efficient channels through which transfer of technology takes place in the host economy.

This research focuses on transfer of technology from manufacturing MNCs to their local suppliers through backward linkages. Based on the survey of foreign firms in Jordan, this research explores the extent of technology transfer by foreign firms through backward linkages. In addition, this research examines the impact of several contingent variables on the extent of technology transfer.

Previous studies reveal that the actual impact of FDI varies across countries due to the differences in the business environment, the development of the host countries, and the magnitude of the FDI inflow. With respect to differences in the results across countries, it is of interest to compare whether the results of this study, particularly the transfer of technology to local suppliers, are similar to the results reported in the various emerging economy host countries. Javorcik (2008, p. 146) argued that even in the case of occurrence of the spillovers to local suppliers, one should not expect a uniform effect across countries or across industries within a country for several reasons: First, the decision to purchase inputs locally will be driven by the host country's trade regime, efficiency, the predictability of its customs service, and transport cost. The choice of input source also depends on whether a multinational enterprise follows a centralised sourcing arrangement in order to benefit from volume discounts or access to customised inputs (UNCTAD 2001). In addition, Maja et al., (2009) indicated that the previous studies reveal that the actual impact of FDI varies across countries due to difference in the size and the sectoral composition of FDI.

By reviewing the previous literature of backward linkages and technology transfer (e.g. Blomstrom et al., 2000; Giroud, 2003; UNCTAD, 2001; Javorcik, 2004; Jabbour and Mucchielli, 2007; Javorcik, 2008), it has been found that the intensity of backward linkages between foreign firms and domestic suppliers and the extent to which those linkages will create technology transfer depends on a multiplicity of factors. There are some factors that have general agreement in terms of their effect on the extent of technology transfer from foreign firms to local suppliers through backward linkages, whereas other factors still need further research. For example, there are many empirical studies that identify the technological gap between the foreign and host firms as a barrier to further technology transfer. However, there is less consensus on the effects of several factors on the transfer of technology from MNCs to their local suppliers such as ownership structure, size of firm, the level of autonomy granted to the firm concerning the decisions of where to source major inputs, market orientation, and age of the firm. Therefore, this research focused on those factors about which there is no general agreement on their effect on the extent of technology transfer, even though the impact of these factors could vary from country to country due to the differences between the host countries in terms of their policies toward FDI and the level of local firms' development.

We also argue that in spite of these linkages between multinational enterprises and local industries in host countries, receiving considerable attention in the literature (e.g. Blomstrom, et al, 2000; UNCTAD, 2001; Meyar, 2004; Giroud, 2003, 2007; Javorcik, 2008), the factors that affect technology transfer from multinationals to local industries through backward linkages are still not well understood. In other words, there is no general agreement on the factors that affect this transfer. Most of the available empirical studies have revealed different or conflicting findings. As Crespo and Fontoura (2007) indicated, the empirical evidence does not allow us to draw eventual conclusions for the majority of the factors that may have an effect on spillovers. The strongest empirical result relates to the importance of the absorptive capacity of domestic firms, which appears to be an essential precondition for enabling them to capture these indirect benefits from FDI. "Concerning the remaining factors, the evidence is inconsistent in

some cases, or is still insufficient to allow for unequivocal conclusions” (Crespo and Fontoura, 2007, p. 420).

Based on the above discussion, even though there has been a considerable number of studies relating to the transfer of technology, there were several factors that motivated further research in this area. In other words, there is an actual need to undertake more research to examine the impact of several independent variables on transfer of technology by backward linkages (for more details see Chapter 4).

Jordan is among the developing countries that strive to reach high levels of economic growth and to fill the development gap with developed countries. However, these countries rely greatly on the imitation of foreign innovations in their growth process due to lack of capacity to undertake research and development activities and to generate technological innovations. Therefore, the important issue for policy makers is whether or not FDI assists in upgrading the technological capacities of host country firms, and which types of industries contribute more to upgrading the technological capacities of host country firms. Further, what are the factors that affect the transfer of technology from foreign firms to local firms? Since no reliable statement can be made from previous research about the factors that can determine the extent of technology transfer via backward linkages, this research has attempted to answer these questions by using surveys of foreign firms operating in the Jordanian industrial sector.

1.3 Research questions

This research is concerned with answering the following main questions, in addition to some complementary questions:

1. To what extent does the formation of backward linkages take place between MNCs and local firms in Jordan.
2. What are the main reasons that hinder the use of local suppliers by MNC subsidiaries in Jordan?

3. To what extent does transfer of technology take place from MNCs to local suppliers through backward linkages in Jordan?
4. What are the main factors that affect the transfer of technology from MNCs to local suppliers in a country such as Jordan?

1.4 Research aims and objectives

This study aims to explore the extent of technology transfer from MNCs operating in industrial sectors to their local suppliers through backward linkages in the context of Jordan. It also examines what kind of foreign firms are most favourable for the creation of backward linkages and transfer of technology to local firms. More specifically, the study aims to distinguish between foreign affiliates in terms of the transfer of technology as well as several independent variables: including the type of industries, market orientation, experience of the firm in host country, the ownership structure, size of the firm, the level of the autonomy granted to the firm, origin of the firms, and the geographical proximity.

Therefore, this research is specifically concerned with achieving the following research objectives:

1. To determine the extent of usage of local inputs by foreign firms operating in manufacturing sector in Jordan.
2. Identifying actual problems or obstacles that affect the creation of backward linkages with local firms. An understanding of these obstacles is important to maximise the benefits of FDI to the Jordanian economy.
3. To determine the extent of technology transfer from foreign firms to local suppliers through backward linkages in Jordan.
4. To determine the relationship between the extent of technology transfer and the type of industries, market orientation, experience of the firm in host country, the ownership structure, size of the firm, the level of the autonomy granted to the firm, the origin of the firms, and their geographical proximity.
5. To propose relevant policy solutions to the obstacles that affects the creation of backward linkages with local firms in order to enhance this process.

1.5 Research methodology

The research philosophy is derived from a positivistic paradigm in which the research problem stems from the literature itself. The researcher seeks to cover a set of gaps in the literature that are clearly demonstrated in the following chapters. The positivistic paradigm, employing a cross sectional survey methodology, was considered the most appropriate approach for conducting this research.

The research population in this study includes firms from the garment, engineering, electrical and electronic, and chemical industries. The reasons behind choosing these firms is due to the presence of these firms and due to the expected transfer from these firms compared to other industries, such as food industries and mining industries. Further, a survey of a single industrial sector limits the ability to generalise the results of this research. Therefore, the four industrial sectors have been chosen to increase the sample under study. In addition, the four industrial sectors allow for comparison between these industrial sectors regarding the transfer of technology to fill the gap of previous studies, which are mainly concentrated on only one industry sector. In addition, the number of firms in a single industrial sector is limited; thus, it is insufficient to allow for using advanced analyses technique such as multiple regression because this technique requires a sufficient number of the respondents.

A questionnaire was used as the main method of data collection. This was complemented by thirteen semi-structured, face-to-face interviews with foreign firms' purchasing managers operating in Jordan. Pilot work was done prior to distribution of the final version of the questionnaire as several drafts were developed and revised in response to feedback received from referees and panel experts. Despite some obstacles during the fieldwork, such as harsh weather during winter time, the procedures for administering the questionnaire were implemented well. 223 questionnaires were distributed personally, 93 of which were considered useable. External and internal validity were established in this research. Reliability was tested through the "Alpha" test and all the scales in the questionnaire were considered reliable.

Descriptive statistics in terms of means and frequency were used to meet descriptive objectives. In addition, correlation and multiple regression analyses were used to answer the research hypotheses and questions. However, qualitative data was analysed relying on descriptive analysis, quoted statements and the transformation of data into categories and systematic themes.

1.6 Research contribution

As seen in the previous sections, there is a need for more research in the field of technology transfer through backward linkages (see chapter 6 for more details). However, the researcher believes that the study can contribute to a deeper understanding of technology transfer from foreign firms to their local suppliers in several ways.

First, the major and initial contribution to knowledge from this study is that this study extends prior transfer of technology research by examining a wide range of potential factors (ownership structure, market orientation, size of firm, the level of the autonomy granted to the firm concerning the decisions of where to source major inputs, and age of the firm, geographic distance, type of industry, and country of origin of the firm) that may affect transfer of technology from MNCs to their local suppliers. However, recent research indicates that the empirical research conducted to date has examined the impact of few contingent variables. In addition, the relationships between the dependant and independent variables are still not clear due to the limited research in this area and also due to the mixed findings of the previous studies. Therefore, additional insights can be gained by considering additional contingent variables. By taking other factors into consideration, our study can contribute to a deeper understanding, since previous studies' findings show mixed results regarding the effect of transfer of technology. In addition, according to the researcher's best knowledge, this study is the first piece of research done on backward linkages and transfer of technology in Arab countries.

Second, this study also looks at differences across industries in terms of technology transfer, which is neglected in previous studies, our understanding about the role of the type of industry in transfer of technology between foreign firms and their local suppliers

has increased. This also allows us to make comparisons between the various industrial sectors in terms of the extent of technology transfer, which to our knowledge has not yet been tested.

Third, one of the important contributions of this study is to identify actual problems or obstacles that affect the creation of backward linkages with local firms. An understanding of these obstacles is important to maximise the benefits of FDI to the Jordanian economy.

Fourth, this research followed a different approach in which the researcher measured the transfer of technology via several types of knowledge exchange between foreign firms to their local suppliers as indicators of technology transfer; this approach represents real knowledge transfer represented by the assistances provided by MNCs to their local suppliers, whereas most of the previous research studied the effect of the presence of foreign firms on the local firms' productivity. According to Javorcik (2008, p.150), the previous studies attributed the positive relationship between the presence of MNCs and productivity improvements in supplying sectors to the existence of technology transfer, but it is not necessary that such technology transfer exists, this increase in productivity in supplying sectors may be caused by the efforts of the suppliers themselves to improve their performance, or it could result from the demand due to the entry of multinationals, but not from the technology transfer.

Fifth, most of the studies on technology linkages have been case studies of specific firms and industries in selected host developing countries (UNCTAD, 2001). Therefore, the number of foreign firms included in our study is large enough to enable some advanced statistical analysis as a complement to earlier case studies.

Sixth, one of the significant contributions is that our study conducted both quantitative and qualitative analysis, whereas most previous studies have been subjected to only limited analysis.

Seventh, this research contributes to our understanding in terms of the role of the ownership structure of FDI projects for the host country and its effect on technology transfer from foreign firms to their local suppliers, which to our knowledge has been rarely tested before. Thus, we examine whether wholly owned foreign affiliates and investments with joint domestic and foreign ownership are associated with a different magnitude of spillovers within the industry of operation and to upstream sectors supplying intermediate inputs.

Finally, most of the previous empirical studies that have studied this phenomenon have considered various emerging economy host countries (reviewed in Chapter 4). Therefore, there is need to consider developing countries to expand our understating concerning this phenomenon. Furthermore, this study contributes to the backward linkages and transfer of technology literature by providing some guidance for future technology transfer research.

1.7 Structure of the thesis

In addition to this chapter, the thesis comprises nine further chapters.

Chapter Two: This chapter presents the definition of the main terms related to this study, including foreign direct investment, Multinational Corporation, knowledge and technology transfer, and backward linkages. The concepts related to the relationships between suppliers and buyers are also reviewed. This chapter also discusses the impacts of MNCs on the host country based on the previous studies, focusing more on transfer of technology through the backward linkages that foreign firms create with local suppliers. This chapter reviews the benefits of FDI to the host country, discusses the role of multinational corporations in the area of technology transfer, explains the concepts of inter-industry and intra-industry spillover, and describes the various forms that spillover can take, both within and between industries. This chapter also reviews the concept of backward linkages; its importance, development, benefits to both foreign and local firms, determinants, and its role as a channel of technology transfer.

Chapter Three: This focuses on the host country's business environment, and in particular, the case of Jordan, which might have an effect on the impact of MNCs on a host country, particularly the creation of backward linkages with local companies and transfer of technology. This chapter also provides background about Jordan, its economy, Free Trade Agreements, statistics about FDI inflows to Jordan, the incentives provided to foreign investors, as well as the clustering of foreign firms.

The business environments of host countries could decrease or increase the benefit to the host country from the operations of foreign firms, especially in the formation of backward linkages process. Thus, this chapter provides a detailed discussion about the investment environment of the host country in which foreign firms are established and operate. This chapter also discusses some of the characteristics of the host country, which might have an effect on the impact of MNCs on a host country. This chapter also looked at the determinants of FDI inflows and changes in location advantages. The source of technology to developing countries is also discussed in this chapter.

Chapter Four: This chapter develops and justifies the research theoretical model and formulates the hypotheses that will be investigated in this study. This chapter discusses the building of the research theoretical model based on the literature review. In addition, this chapter discusses the need for this study and the research questions. Further, this chapter introduces the operational definition for the research variables in the model. The suggested relations between research variables and the formulations of the hypotheses are given in this chapter. Finally, the chapter ends with a discussion of the independent variables that will be investigated in this study and their relationship with technology transfer.

Chapter Five: This chapter describes the research methodology and design, and the data collection methods utilised to achieve the research objectives. It starts with an overview of the research design and philosophy, including the type or approaches to research, followed by justifications for the chosen study research methodology and design, including the population of the sample. In addition, the two main data collection methods

used in this research for primary data collection are discussed, namely, semi-structured interviews and personally administered questionnaires in terms of their design, structure, content and all other issues related to each method. Finally, the chapter concludes with a discussion and justification of the statistical methods that are used to analyse the data.

Chapter Six: The main aim of this chapter is to present and analyse the qualitative data produced from the semi-structured interviews. Therefore, a descriptive analysis using frequency distribution is applied to present the findings from these interviews and, where suitable, some significant statements are quoted from the interviews to illustrate relevant points.

Chapter Seven: This chapter presents the results of the questionnaire responses (quantitative data). It is also concerned with the descriptive analysis of the research variables. In addition, this chapter describes the statistical methods used for testing the research hypotheses and reports and interprets the results of the statistical analysis pertaining to research hypotheses. The findings of this chapter, together with the findings from the interviews, are discussed in Chapter Eight.

Finally, Chapter Eight: This chapter summarises and discusses the major findings of this study through answering the research questions. The implications and limitations of the study are presented. The possibilities for further research are presented in this chapter as well.

Chapter Two

MNCs, backward linkages, and the impacts of MNCs on a host country's economy

2.1 Introduction

FDI by (MNEs) and through technology transfer to a host country, either by spillovers or linkages, are of critical importance for economic development, particularly for developing and transition economies (Ivarsson and Alvstam, 2005; Kugler, 2006; UNCTAD, 2001; Jindra et al., 2009). A common explanation behind this is that MNEs possess advanced technological and managerial advantages, and when this knowledge is transferred to local firms, it improve endogenous firms' own capabilities (Giroud, 2003; Lall and Narula, 2004; Cui et al., 2006; Jindra et al., 2009).

There is a package of potential impacts on a host country when MNCs establish a subsidiary overseas; technical know-how, financial, and managerial skills, combined together, have far-reaching implications for the host economy (Dicken, 2003). Local firms benefit also from the network of alliances and suppliers of MNEs. However, these potential impacts are contingent on the interaction between the nature of a foreign subsidiary and the nature and characteristics of the host economy (Blomstrom et al., 2000; UNCTAD, 2001). All these potential benefits may lead to improvements in the productivity of local firms (Harrison et al., 2000). FDI by MNCs is a major channel for access to advanced technologies by developing countries (Borensztein et al., 1998).

This chapter provides the definitions of the main terms, along with a review of the concepts related to the relationships between suppliers and buyers. Furthermore, this chapter discusses the impacts of FDI on the host country based on previous studies, with more focus on the creation of backward linkages and the transfer of technology through backward linkages that foreign firms create with local suppliers.

Therefore, the structure of this chapter is as follows: Section Two deals with the definition of the main terms relevant to the present study, which includes foreign direct investment, Multinational Corporations, knowledge and technology transfer, and backward linkages. Section Three discusses the related concepts of the relationships between buyer and suppliers represented by foreign firms as buyers and local firms as suppliers. Section Four further explores the types of relationships between suppliers and buyers. Section Five discusses, in short, the benefits of FDI to the host country. Section Six discusses the role of multinational corporations in the area of technology transfer. Section Seven explains the concepts of inter-industry and intra-industry spillover and describes the various forms that spillovers can take, both within and between industries. Section Eight details with backward linkages; their importance, development, benefits to both foreign and local firms, determinants, and their roles as channels of technology transfer. Section Nine concludes the chapter with a brief summary.

2.2 Definition of terms

Before commencing on this research, it is necessary and, in fact, important to first define the key terms and their exact meanings in order to clarify the terms as they pertain to this research.

2.2.1 Multinational Corporations

Defining exactly what Multinational Corporations (MNCs) means is important. MNCs are also known by the other popular names multinational enterprises (MNEs) and Transnational Corporations (TNCs). The United Nations Organization now prefers to use TNCs rather than MNCs and MNEs. The term TNC has the advantage that it carries the general connotation of referring to activities taking place across national boundaries (Chen, 1983). Buckley and Casson, (1991, p.1) defined MNE “as an enterprise which owns and controls activities in different countries”. Markusen (1995, p.170) defined MNEs as “...firms that engage in direct foreign investment, defined as investments in which the firm acquires a substantial controlling interest in a foreign firm or sets up a subsidiary in a foreign country”. However, “definitions are not right or wrong, just more or less useful” (Buckley and Casson, 1985, p.2).

Researchers used different thresholds for considering the firms as foreign firms. For example, Sinani and Meyer (2004) consider firms with at least 10% equity owned by foreigners to be foreign firms. They use the definition of the OECD for foreign firms in which foreign firms have at least 10% of their nominal capital owned by foreigners. Sjöholm (1999) take 15% of equity owned by foreigners as the threshold, while Haddad and Harrison (1993) consider firms with at least 5% equity owned by foreigners to be foreign firms. In this research we follow Sinani and Meyer (2004). Therefore, we consider firms with at least 10% equity owned by foreigners to be foreign firms. Furthermore, throughout this research we use the terms MNCs, subsidiaries and foreign firms interchangeably.

2.2.2 Foreign Direct Investment

Most developing countries have low saving rates (Balioune-Lutz, 2004). Therefore, for these countries, foreign capital constitutes a critical source of finance. Such finance may take the form of portfolio investment or FDI.

The European Commission defined foreign direct investment as “the establishment or acquisitions of income-generating assets in a foreign country over which the investing firm has control” (Harrison et al., 2000, p.251). Also, U.S. government statisticians define FDI as “ownership or control of 10 percent or more of an enterprise’s voting securities... or the equivalent interest in an unincorporated U.S. business” (Griffin and Pustay, 1999, p.104). The International Monetary Fund (IMF) broadly defines FDI as the establishment of, or acquisition of, substantial ownership in an enterprise in a foreign country; and in a narrower sense, as an enterprise in which non-residents hold 25 percent or more of the voting share capital. In practice, FDI usually entails the ownership, whole or partial, of a company in a foreign country and control of foreign assets. On the other hand, Portfolio Investment represents investment in securities such as foreign stocks, bonds, or other financial assets, none of which entails effective management control over an enterprise (Harrison et al., 2000).

FDI may take many forms, including purchase of existing assets in a foreign country, new investment in property, plant, and equipment in a green field site, a takeover or merger, or participation in a joint venture with a local partner (Griffin and Pustay, 1999). The most complex form of international business operations is direct investment. It involves the ownership and management of physical facilities for producing goods in foreign countries. FDI could be a part of the firm's overall strategy, or to overcome trade restrictions imposed by foreign governments. Therefore, firms find it advantageous to invest directly in a country and establish a subsidiary in order to avoid host country trade barriers or to take advantage of host government economic development incentives.

The purpose of both FDI and portfolio investment is to generate a financial return, but the means of doing so and the implications for the firms and the host country are different. While foreign direct investment enables the investors to retain control over its foreign operations, it involves high risk compared to portfolio investment (Harrison et al., 2000). For example, when the company builds a major new plant abroad, it might not be able to sell the plant at an acceptable price if the investment fails. It also cannot recover its investment in the training of its foreign workforce. In addition, inward portfolio investments are, in general, short-term financial flows viewed as highly volatile, whereas, FDI is usually of a longer duration and tends to contribute non-tangible assets such as know-how, management skills, advanced technology, and positive spillover effects to domestic firms (Baliamoune-Lutz, 2004).

2.2.3 Backward and forward Linkages

Lim and Fong (1982, p.586) defined linkages as direct relationships established by firms in complementary activities, which are external to pure market transactions and essential to the functioning of any normal industrial market. According to Battat et al., (1996, p. 4) the term backward linkage refers to those “inter-firm relationships in which a company purchases goods and services as its production inputs on a regular basis from one or more other companies in the production chain”. Thus, the backward linkages refer to the relations between MNC subsidiaries and their suppliers, while forward linkages refer to

the relations between MNC subsidiaries and their customers, which are related to marketing of final products, including after-sale services. The two main types of linkages created are backward and forward linkages (UNCTAD, 2001; Blomstrom et al., 2000; Caves, 1996; Dunning, 1993; Lall, 1996). The linkages established by foreign firms with local suppliers of parts and components are the most important of these linkages (Lall, 1996, UNCTAD, 2001). In addition to the backward and forward linkages, the firm may create horizontal relationships that can be based on cooperation or competition with other firms that produce similar products.

Some of the knowledge and technology transfer between MNC subsidiaries and local firms occur through backward and forward linkages, which MNCs create with their local suppliers and customers. This transfer takes place when local firms benefit from MNC subsidiaries' superior knowledge and technology (Lall, 1980; UNCTAD, 2001). This research will focus on the transfer of knowledge and technology through backward linkages with local suppliers and subcontractors.

However, one of the most important deterrents of a foreign firm's impact on the technology and skills in a host country is the extent of its forward and backward linkages with local firms (UNCTAD, 2001). Therefore, it is expected to find more technology transferred by FDI in linkages-intensive industries than by FDI in industries where such linkages are weak.

2.2.4 Knowledge and Technology transfer

In fact, the definition of knowledge and technology is not simple. Describing what it is all about is not simple either. In this context Duanmu and Fai (2007) indicate the definition of explicit and tacit nature of knowledge continues to lack precision in spite of these terms being in commonplace use in business and management literature today.

Polanyi (1962) cited in Ernst and Kim (2002) classified knowledge into explicit (codified) and tacit knowledge. Explicit knowledge refers to the knowledge that can be combined, stored, retrieved, and transmitted with relative ease and through various

mechanisms. Explicit knowledge is codified and embedded in objects, such as books and blue prints. Tacit knowledge refers to knowledge that is deeply rooted in the human body and carried in the minds of individuals that it is hard to codify and communicate (Ernst and Kim, 2002, p. 1423). In other words, tacit knowledge can be expressed through action, commitment and face-to-face interaction. Tacit knowledge is based on experience and the people. However, it can be acquired through observation, imitation, and practice. Ernst and Kim (2002) stated that this kind of knowledge can also be transferred through the movement of human carriers of such knowledge.

The technology is recognized as not only physical machinery and equipment. It may be embedded in tangible assets such as machinery and equipment, or it could be expressed in the form of manuals. However, it is also something intangible; it includes managerial skills, marketing skills technical skills and know-how, which are often called soft technology. Technology is a part of knowledge, which normally involves more scientific elements (Teece, 1977; Contractor, 1980).

Brusoni et al., (2001) distinguished between technological knowledge and managerial knowledge. Technological knowledge can be understood as the understandings and practice that support product design and manufacturing, whereas managerial knowledge is defined as the skills and techniques needed to manage and organise production and transaction.

“Business firms depend on many kinds of knowledge, much of which can be classified as technological knowledge (regarding production) or market knowledge (concerning exchange). Some knowledge, partly overlapping these categories but distinct from them, is concerned with how people work together to achieve collective goals; this is organisation knowledge” (Buckley and Carter, 2000, p. 58). “New technologies include not just products and processes but also new methods of organising firms, managing inter-firm relations and supply chains, linking to innovation and so on”(Lall, 2004, p.190).

The transfer of technology can take place by many channels such as FDI, through backward and forward linkages with suppliers and buyers, training of local employees and demonstration effects. Demonstration effects occur when local firms successfully imitate technological innovation introduced by MNCs or their behaviour (Blomstrom et al., 2000). In addition to the potential transfer by FDI, transfer of technology can occur directly through franchising, licensing, imported machinery and equipment, employment of foreign experts and so on.

The impact made by foreign subsidiaries on their local suppliers is one of the main potential sources of spillover. Technology spillover is defined as a geographical diffusion of technology that may raise the level of human capital in the host country and increase productivity in local firms (Blomstrom, 1989) cited by Hatani, F (2009, p.159). However, according to recent literature no individual source of technology is the best, and historical experience suggests that the most effective transfer of technology, new ideas, processes and skills involves a combination of the above resources.

According to Edmondson et al. (2003, p. 200), when knowledge is codified, transfer across individuals involves transmission of documents or manuals. For codified know-what, transfer is complete with the acquisition of such materials, while for codified know-how, there is information that needs to accompany such documentation. (For example, the practice and discussion that must take place between two parties in order for the prescribed tasks to be executed in the new setting). Kugler (2006) argues techniques that can be adopted from general knowledge in manufacturing activities generally require less absorptive capacity than specialised technology intensive processes.

Since our research focuses on firms in manufacturing industries, the definition provided by Roessner cited in Bozeman (2000, p.629) is appropriate for this research. He defines the concept as “the movement of know-how, technical knowledge, or technology from one organization sitting to another”. Thus, knowledge transfer can be defined simply as placing knowledge into a different environment. It is the movement of knowledge and technology into a country in which it had not been used previously. However, knowledge

of a more complex type is likely to be better understood and appreciated through close relationships than through arm's length relationships (Hansen, 1999, Lane & Lubatkin, 1998). However, in this study, the expressions technology transfer and knowledge transfer are used interchangeably.

2.3 Related concepts to backward linkages

There are many related concepts that have emerged due to expansion of related theories of the firm discussed above. These concepts play a significant role regarding the linkages creation process between buyers and suppliers. Therefore, these concepts should be discussed to make the picture clearer and to enable us to constitute the framework for this study. These concepts include: the level of trust, psychic distance, vertical integration, the power of the firm, and the bonds between buyers and suppliers.

2.3.1 The level of trust

When a firm decides to go global, it faces a much more complex environment compared to its local environment in terms of economic, cultural and political dimensions; it is also more complex because these various dimensions are surrounded with uncertainty in international situations. "There are added costs of doing business in another country, including communication and transport costs, higher costs of stationing personnel abroad, barriers due to language, customs, and being outside of the local business and government networks" (Markusen, 1995, p. 173).

The concept of trust is defined as "calculative, risk-related, and relationship-based in the continuous economic exchange" (Kwon et al., 2005 p.2). Trust is a relationship-based concept, which is created, reinforced, or decreased by bilateral relational activities in a series of economic exchanges. Trust, therefore, should be defined as distinctive to something involving goodwill. Chu and Dyer (2003) characterised inter-firm trust as a construct based on three related components: reliability, fairness and goodwill. Operationally, trust is defined as a willingness to take a risk (Johnson-George and Swap 1982; Mayer et al., 1995; Williamson, 1993). Trust is warranted when the expected gain from placing oneself at risk to another is positive and the decision to accept such a risk is

taken to imply trust (Williamson, 1993). This definition of trust is closely related to “calculative trust,” under which companies may behave in a trustworthy manner due to credible commitments they have made with a trading partner (Chu and Dyer, 2003; Williamson, 1993).

Recent literature in institutional economics emphasises the importance of trust to reduce transaction costs within inter-organisational arrangements (Barney and Hansen, 1994; Jarillo, 1988; Chu and Dyer, 2003). For example, Chu and Dyer (2003) undertook an empirical study to investigate the relationship between supplier trust in the buyer, transaction costs and information sharing. Their findings indicate that perceived trustworthiness reduces transaction costs and is correlated with greater information sharing in supplier-buyer relationships; they further indicate that trust may be an important source of competitive advantage.

In particular, when complex products are exchanged, where the participation of the customer in design or production is crucial for the success of the product, trust is considered as highly important for reducing management and coordination costs (Kaas, 1992) cited in Kwon et al., (2005).

However, the level of trust is important and should be taken into consideration. For example, when the firm decides to establish relationships with local suppliers, the trust that may have developed between the parties within a specific relationship due to previous contacts in connection with deliveries or other activities before or after earlier transactions has a profound influence on behaviour. This is the case especially if there is a high degree of environmental uncertainty because the level of trust is different according to the country and the dominant culture in the host country. Therefore, the existing level of trust in a host country is expected to determine the type of economic coordination adapted by firms and increases the inter-firm linkages. Thus, an inter-firm network is welcomed when economic coordination and trust are dominant through the market and each member of the parties has confidence in the other members.

Some authors, for example Holmlund and Kock (1995), argue that trust, which is a form of mutual confidence or reliance, can be regarded as a prerequisite for all kinds of relationships, and a prerequisite for lasting relationships is the absence of opportunistic behaviour, because the lack of trust often makes it impossible to continue to make exchanges. However, other authors emphasise that not all relationships result in mutual benefit, and they are not all based on mutual trust and nor do they always need to be and that trust alone cannot be depended upon (Kalafatis, 2000; Svensson, 2001 cited by Hingley (2005).

2.3.2 Vertical integration

Internalisation involves the absorption of other organisations or their tasks (Thorelli, 1986, p.37). The most common example of internalisation is vertical integration, where the series of related activities are combined. Therefore, the extent to which the firms internalise the market will affect the extent of its linkages with other firms in the host country. Thus, internalisation of the foreign firm's activities will be an important factor in our study, as it influences the creation of linkages with local suppliers.

A corporation's unfamiliarity with potential suppliers raises the costs of gathering information and coordination transactions with suppliers. Therefore, a firm may regard vertical integration as a way to avoid potential supplier's problems, such as transportation strikes, late delivery, or poor product quality that could lead to a production shutdown. These fears are often found in a poorly developed market environment. Supplier's skill levels and management capabilities may be low, and in developing countries this can often lead to quality problems and high rejection rates, which in turn can lead a large corporation to choose either foreign suppliers or in-house production in future transactions.

2.3.3 Psychic distance

There is often a distance between a selling and a buying firm, both in a geographical and mental sense. These distances cause difficulties for the different types of flows between buyer and seller, such as flow of information and products. Therefore, the

internationalisation of firms takes place gradually. Firms often start their business operation in their domestic market, and then enter into international markets, first to neighbouring countries and later to other countries with longer business distances (physical, cultural and economical distance) within continent of the firm. Finally, they might enter into markets in other continents and became global (Luostrainen, 1994).

However, market entry decisions are influenced by ‘psychic distance’. ‘Psychic distance’ is defined as “factors preventing or disturbing the flows of information between firms and markets. Examples of such factors are differences in language, culture, political systems, level of education, level of industrial development, etc” (Johanson and Paul, 1999, p. 29). Firms with little experience of foreign markets prefer markets with a short psychic distance and subsequently enter foreign markets with successively greater ‘psychic distance’. These factors have been selected due to the observation that the levels of development and education must have reached a certain minimum level in order to allow trade to take place.

Hallen and Wiedersheim-Paul (1999) argue that in order for the supplier relationship to be effective and thus profitable, ‘psychic distance’ should not be too substantial. Psychic distance, therefore, leads to difficulties between buyers and suppliers in terms of perceiving or estimating the needs of each other. For this reason, this concept should be taken into consideration when studying the transfer of technology from MNCs to their local suppliers.

2.3.4 Power and position of the firm

Power is the central concept in network analysis. Authors such as Cox and Watson (2003) cited by Hingley (2005) consider that power should be at the centre of any study of buyer-seller relationships. Thorelli (1986) defined power as the ability to influence the decisions or actions of others.

At each point in time, the firm has certain positions in the network, which characterises its relationships to other firms. This position is defined, according to Johanson and

Mattsson (1987), by the (1) identity of direct and its indirect counter parts, (2) the role of the firm in the network, (3) the importance of the firm in the network, and (4) the strength of relationships with other firms.

The firm position is a result of previous activities in the network. The positioning of the firm depends on its power, which is represented by its technology, expertise, trust, and economic base (Thorelli, 1986). However, the position of the firm in the network depends on the importance of the firm for other firms and the strength of the relationships with other firms as well. Some suppliers, for example, may be regarded as major suppliers for a certain firm but others could be secondary suppliers. Johanson and Mattsson (1993, p.307) distinguished between *micro-positions* and *macro-positions*. A micro-position refers to the relationship with a specific individual counterpart, while a macro-position refers to a network as a whole or to a specific section of it.

2.3.5. The bonds between buyers and suppliers

Establishing relationships between actors such as suppliers and buyers is not an easy task; it takes time and effort to develop. Often, the relationship starts with an interaction. According to Holmlund and Kock (1995), interactions consist of three types of exchanges: (1) business exchange, (2) social exchange, and (3) information exchange. One or more of these exchanges takes place every time firms interact with one other, and every interaction leads to investments in different kinds of bonds. The goal of the firm is to gain access to resources controlled by the other firm; for example, technical competence, money and raw materials.

However, as an aspect of these relationships, *bonds* of various kinds will be developed as a consequence of commitments and the use of resources for a specific purpose in order to achieve stability, closeness, security, and long-term relationships with other firms in the network. Johanson and Mattsson (1987) distinguished between many types of bonds: planning, knowledge, social, economic, and legal bonds. *Technical bonds* are based on technical adjustments of the product, materials, equipment to the buyer, and can be very hard to break for a new supplier. *Planning bonds* are based on logistical co-ordination,

when the firms adjust their logistic functions to each other and, for example, implement just-in-time deliveries and on-line-contact, whereby costs for stock keeping are substantially reduced. *Knowledge bonds* pertain to knowledge about the counterpart, which develop gradually as the firms learn about each other in terms of their strengths, weaknesses, needs, problems, and possibilities. *Social bonds* are based on personal confidence and liking; this kind of bond takes time to develop and is based on individual representatives getting to know and trust each other and can be a complement to written contracts. *Economic and legal bonds* concern the special credit agreements and long-term contracts such as forms of cooperation, payment terms, and so on.

However, in the interest of the buyer it is often desirable to minimise the number of suppliers in order to decrease the exchange costs (Axelsson, 1991 cited by Holmlund and Kock 1995). Long-term relationships create a pressure for development, which in turn results in investments in bonds and commitment. Thus, the evolving bonds make it more difficult and costly to break the relationship (Holmlund and Kock 1995).

It has been noted in network literature that cultural bonds influence the possibility of having local suppliers as partners in the MNC network. Along with economic, functional and technical bonds, the cultural similarities between firms allow them also to co-operate more easily (Giroud, 1997).

2.4 Supplier buyer relationships

Sometimes the buyer may wish to change the present suppliers and may look for a new supplier or to add a new one. On the one hand, this could happen because the buyer is not satisfied with the present suppliers due to dissatisfaction with the quality offered, deliveries, adaptations, technology, payment terms or price. Therefore, the buyer may want better quality, technology, payment terms, lower price or more competitive payment terms. On the other hand, the buyer might be looking for an additional supplier to decrease the dependence arising from having only one supplier. In the case of having more than one supplier, this can provide the buyer with many advantages. For example, the buyer can spread the orders and acquire more general product, price, and market

information. Having more than one supplier helps the buying firm to obtain more information about prices and innovations and thereby have better information when making decisions. Moreover, by adding a new supplier, the buyer can keep the suppliers aware of the possibility that they can be replaced if they fail in some way or try unreasonably to increase the price (Holmlund and Kock, 1995).

2.4.1 Types of Relationships

Some relations between buyers and suppliers are based on formal and legal contracts. For example, through a firm, both parties can commit to a contract by preparing and signing a legal document that sets out the terms and conditions of future transactions. If a firm were to breach such a contract, it would be legally liable for damages or restitution payments. There are also informal or non-contractual relations built on trust, whereby through a firm can enter into informal or unwritten agreements with various other parts. The economic value of trust will be more when it is based on non-contractual terms instead of contractual mechanisms, because in such case trust eliminates the need for formal contracts which are required costs in terms of its writing, monitoring and enforcing (Barney and Hansen, 1994).

Research on inter-organisation networks has tended to focus on relatively formal or contractual relationships among firms in industry, such as strategic alliances, or obligation linkages such as subcontracting. However, there is a variety of other, sometimes less formal, networks that may be important for the diffusion process. These may include collaboration among firms in industry and universities, professional associations, government and so on (Swan and Newell, 1995).

2.4.2 Subsidiary Local Embeddedness

One of the basic assumptions of the importance of local 'embeddedness' of a foreign subsidiary is that closeness in the relationships with customers, suppliers and other counterparts improves the subsidiary's ability to absorb new knowledge from the environment (Hansen, 1999 and Andersson et al., 2005). In light of this idea, this will

lead also to the improvement of a local supplier's ability to absorb new knowledge from the foreign subsidiary.

The important idea is that actors who are strongly tied to each other will be in a better position to exchange information, and therefore, to learn more easily from each other (Hansen, 1999). Consequently, an organisation does not have an equal opportunity to learn from all other organisations. Therefore, the possibility of a firm to identify new knowledge in its environment, and its ability to assimilate this knowledge depends on the closeness of its relationships with different business partners. However, a subsidiary's tendency and ability to develop close relationships with local business partners takes time and is influenced by many factors outside the subsidiary; for instance, by the behaviour of these partners (Lane and Lubatkin, 1998).

2.5 Benefits of FDI to Host Country

Growing competition to attract the inflow of FDI between developing countries has resulted from the belief that FDI has many positive effects on host country. These effects include positive outcomes on economic growth, transfer of technology, employment generation, managerial skills and know-how in the domestic market, employee training, access to markets, international production networks and a positive effect on the balance of payments (Caves, 1996; Alfaro et. al, 2004).

2.5.1 Transfer of Technology

FDI by (MNEs) is an important channel for technology transfer. In this regard, (Feldstein, 2000) cited by (Loungani and Razin, 2001, p. 2) emphasises the role of FDI on technology transfer: "FDI allows the transfer of technology, particularly in the form of new varieties of capital inputs that cannot be achieved through financial investments or trade in goods and services. FDI can also promote competition in the domestic input market". The concept of technology transfer will be discussed throughout this chapter in more detail.

2.5.2 Management and employees training

Countries receiving FDI often gain a number of benefits. These include employee training in the course of operating the new businesses and advanced management skills, which produce important benefits to host countries and contribute to human capital development in the host country as well as improving education and training systems (Loungani and Razin, 2001). This improvement assists developing countries to ultimately catch up with the economic development of industrialised countries. For example, this was important in the rapid development of economies such as Hong Kong, Taiwan and South Korea, which are now considered some of the fastest-growing, newly industrialised countries with huge export capacity (Razin and Sadka, 2002 and Harrison et al., 2000).

2.5.3 Profits and Balance of Payment Effects

The main source of international finance to developing countries is FDI (Kugler (2006). Profits generated by FDI can contribute to corporate tax revenues in the host country. Sometimes host countries choose to forgo some of this tax revenue in order to attract FDI from other locations (Loungani and Razin, 2001). The effect of FDI on a country's balance of payments is an important policy issue; when an MNC establishes a foreign subsidiary, the capital account of the host country benefits from the initial capital inflow. If FDI switches to import substitution by producing goods that used to be imported by the host country, the effect can improve the current account of the host country's balance of payments. If FDI uses a host country as an export base, this will further improve the balance of payments (Harrison et al., 2000).

2.5.4 Employment generation

FDI by TNCs often contributes directly to incomes and employment by bringing new jobs to a host country that will not be created in the absence of FDI. The operation of MNCs in the host country can affect employment generation in two major ways (Chen, 1983). First, FDI increases employment directly by setting up new foreign affiliates or by expanding existing affiliates. Second, indirectly, the exports arising from the operation of MNCs could have a significant effect on generating new employment by adding

employment in supplier and distributor areas, and through the new income generated by FDI.

FDI affects the quantity and quality of employment in the host country. In terms of the qualitative impact of FDI on employment, such as wages, job security and conditions of work, research has generally revealed that foreign affiliates pay higher wages than domestic firms for similar activities and tend to offer greater job security and better conditions of work than local firms (UNCTAD, 2000). Furthermore, in most cases foreign affiliates tend to maintain employment in acquired firms because the employees of these firms have experience, valuable skills and capabilities.

2.5.5 Host Country Economic Growth

Technology is the backbone behind economic development and industrialisation. FDI plays an important role in a host country's economic growth because it contributes to the technological progress of developing countries (Findlay, 1978; Blomstrom and Kokko, 1997; Borensztein et al., 1998). First, FDI brings advanced technology to developing countries. Previous literature considers technology brought by foreign firms as modern, while technology undertaken by indigenous producers is considered traditional (e.g. Giroud (2003); UNCTAD (2001); Jabbour and Mucchielli (2007)). FDI contributes to growth because modern technology rather than traditional technology tends to promote the modernisation process. Second, the presence of technologically advanced foreign firms leads to the enhancement of the technological levels of indigenous firms through technology spillover to local firms.

Using data from Morocco, Balamoune-Lutz (2004) conducted a study showing FDI contributes to higher growth both directly and indirectly through its effect on export. However, some studies show that FDI has a positive impact on growth rates in host countries, whereas other studies indicate this positive effect might depend on trade policies in the host country (Laaksonen-Craig, 2004; Bengoa and Robles, 2005) or on the level of education and financial markets (Borensztein et al., 1998; Azman-Saini et al., 2010). For example, Azman-Saini et al., (2010) find the positive effect of FDI on

growth only after financial markets development exceeds a threshold level. Their results also highlight the critical role of human capital in allowing growth benefits from FDI to take place. On the other hand, Borensztein et al., (1998) found that FDI increases economic growth when the level of education in the host country is high.

2.6 The role of multinational corporations in the area of technology

The most important contribution MNCs can offer to host countries is technology transfer. For this reason, in most developing countries MNCs are encouraged to transfer their technologies to local operations either through policies or incentives (UNCTAD, 2001 and Byun and Wang, 1995).

However, MNCs are considered generators and carriers of technology. Byun and Wang, 1995, (pp.202-203) argue there are two main reasons behind the substantial attention paid to the role of multinational corporations in the international transfer of technology: First, multinational corporations own, produce, and control most of the world's advanced production technology because they are responsible for a major portion of the world's research and development efforts. Second, they strive to protect their intangible assets that enable them to make foreign investments, while recipients are interested in obtaining technology at the lowest price possible.

2.7 The concept of host country spillover and its forms

The presence of MNCs can lead to indirect, beneficial externalities for host country firms. The presence of foreign firms can affect the productivity of domestic firms in different ways. The nature of the relationship between two firms can be based on their market relationship. The first possibility is that a relationship does not exist between them. The second is that the two firms operate in the same product market as competitors. The third possibility is a supplier-buyer relationship. The spillover in the second case is called 'horizontal', while the third case is called 'vertical' (Halpern and Muakozy, 2007).

2.7.1 Intra-industry spillovers

According to Blomstrom and Kokko (1998) and Blomstrom et al., (2000), productivity spillovers occur when the presence of foreign firms increases the productivity of local firms and MNCs are unable to internalise the full value of these benefits. This could take place in many ways, for example, when local firms improve their quality and productivity, or copying technologies of foreign affiliates operating in the local market either by observation or by hiring workers who were trained previously by foreign firms (Fosfuri et al., 2001). Spillovers also occur when multinationals entry increases the competition among host country; in this case, local firms have to increase their competitiveness by using their existing resources more efficiently or by searching for new technologies. The possibility of other types of transfer also exist, which takes place by subjecting local suppliers to more stringent requirements for product quality and on-time delivery (Blomstrom et al., 2000; Javorcik and Spatareanu, 2008). However, there is very little evidence about such “forced linkage effects” (Blomstrom et al., 2000, p.115). The following sub-sections discuss in more detail ways in which this kind of spillover can take place.

2.7.1.1 Training of local employees in MNC subsidiaries

When MNCs establish subsidiaries in host country, they may undertake the training of local employees and management which cannot be purchased from abroad; especially because these multinationals possess intangible assets which cannot easily be sold, such as managerial skills and entrepreneurship (Blomstrom et al., 2000; Fosfuri et al., 2001). This type of technology spillovers occur through labour turnover, when domestic employees and managerial executives move to join local firms or set up their own companies. This training may affect most levels of employees, from simple manufacturing operatives to top-level managers. When they join local firms or establish their own companies they can bring with them the acquired technological, marketing and managerial skills (Blomstrom et al., 2000; Fosfuri et al., 2001; Sadik and Bolbol, 2001). As a result, the employee trained and educated by a multinational corporation can contribute to the productivity of a local firm. However, this type of spillover is more

important for host developing countries than developed ones, since skilled managers, technicians, and engineers are usually in short supply in developing countries.

2.7.1.2 Demonstration effects and effects of competition

Demonstration effects occur when local firms successfully imitate the technological innovation introduced by MNCs or their behaviour (Blomstrom et al., 2000). The presence of foreign firms increases competition in the host country. Therefore, foreign firms may force inefficient local firms to use their resources more efficiently and to adopt new and more efficient methods of production to stay in the market. Consequently, inefficient local firms may become more productive by investing in additional physical or human capital and adopting new, efficient methods of production (Yoon and Wang, 1995; Blomstrom et al., 2000). Such actions taken by local firms allow them to compete with MNCs and stay in business; otherwise they will disappear from the market. For example, Langdon (1981) cited in Blomstrom et al., (2000) conducted a study in the Kenyan soap industry, and their findings show the entry of foreign MNCs introduced mechanised production, and local firms found themselves unable to sell handmade soap in urban markets. Therefore, they were forced to introduce mechanised techniques in order to stay in business. Technology could be also transferred through straightforward emulation by firms within the same industry, by informal exchange between managers meeting in trade associations or any other occasions - even social functions (Thompson, 2002).

Most of the previous empirical studies focused on intra-industry spillovers (Kugler, 2006). The empirical findings of studies on intra-industry spillover are mixed. The reason, as argued by Kugler (2006, p.445), is that the competition effect is more likely to dominate spillovers within the MNC's industry than between industries. Therefore, the scarcity of empirical findings of intra-industry spillovers stemming from FDI is not surprising. If there is leakage of technical knowledge from the subsidiary to domestic producers, such spillovers are most likely to generate productivity improvements in non-competing and complementary sectors.

In addition, FDI is also regarded as one of the most effective ways to reduce the monopoly power of domestic firms. As a result, this will increase the quality of goods produced and consumed locally (Blomstrom et al., 2000; UNCTAD, 2001).

2.7.2 Inter-industry spillovers

Inter-firm backward linkages, or input linkages, are relationships between buyers and suppliers of raw materials, intermediate, or other input components (UNCTAD, 2001). The vertical relationships between foreign firms and domestic firms could be reflected in one of two ways. First, a domestic firm may be the supplier of foreign firms; this leads to the creation of backward linkages or input linkages in which the transfer of technology may take place. Second, the domestic firm could be the customer of the multinational, in which case transfer or spillovers are called forward spillovers (Halpern and Muakozy, 2007, p.784). Recent literature demonstrates that most technology development and technology transfer from industrialised to developing economies is based on inter-firm linkages (Ivarsson and Alvstam, 2004, P.241), which MNCs create with local suppliers and customers. This transfer takes place when local firms benefit from MNC subsidiaries superior knowledge and technology (Blomstrom et al., 2000). However, empirical findings do not necessarily confirm this belief. By reviewing previous empirical studies (e.g. Blomstrom et al, (2000); Giroud (2003); UNCTAD (2001); Javorcik (2004); Jabbour and Mucchielli (2007); Javorcik (2008),) few results show a productivity increase benefit to firms from foreign presence in the same industry. On the other hand, other studies show that suppliers within an industry can benefit from the presence of foreign firms, especially if the buyers of their products are foreign owned (e.g. Lall, 1980; Javorcik, 2004).

2.8 Backward linkages

“Technology is increasingly the driving force behind global competitive advantage. New technologies affect all manufacturing and service industries, making it imperative for every country to raise its abilities to access and deploy such technologies” (Lall, 2002. p. 80). Therefore, backward linkages from foreign affiliates to local firms, in particular, are becoming increasingly important channels through which intangible and tangible assets

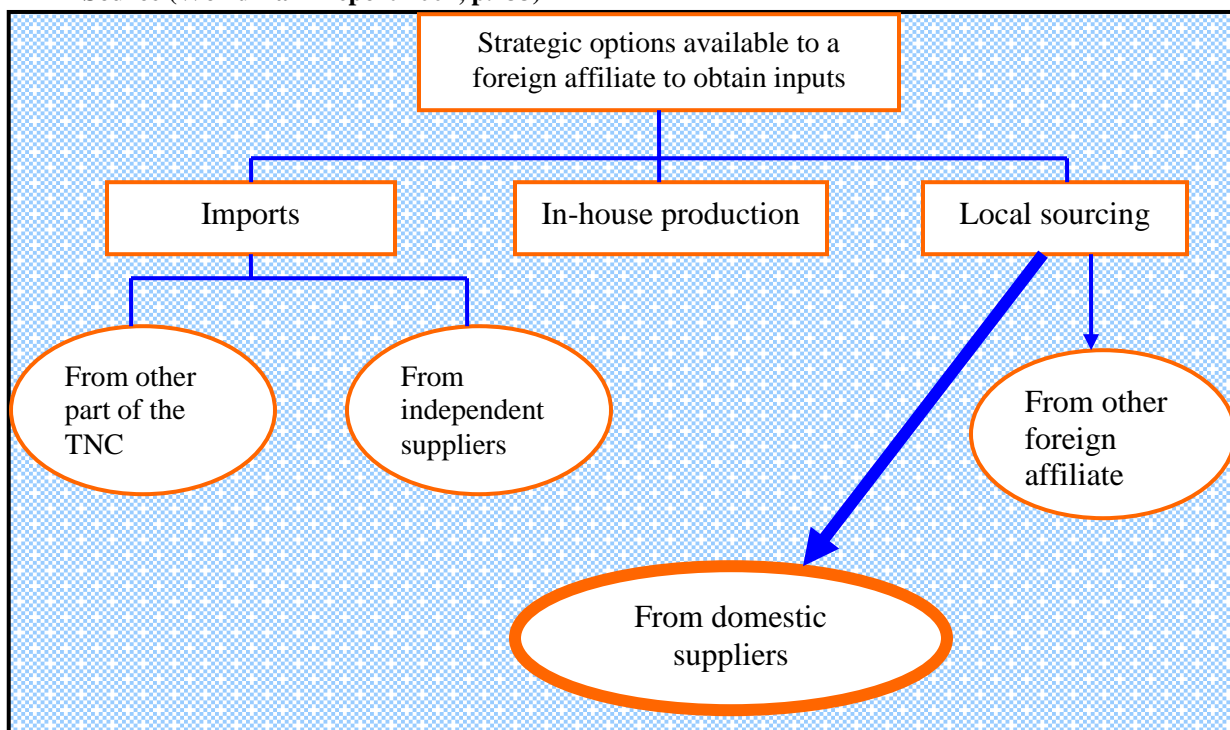
can be passed on from the former to the latter, contributing to an upgrading of local firms and ‘embedding’ and ‘grounding’ foreign firms more in their host economies (UNCTAD, 2001, 2002).

Establishing linkages with suppliers can be an expensive process. According to the UNCTAD (2001. p. 136), “Establishing linkages can be an expensive process. In any setting, efforts are needed to identify suitable suppliers and ensure that they can meet the exacting needs of buyers”. These efforts will be great in developing countries due to a lack of efficient domestic suppliers, which is regarded as a key obstacle to the creation of more linkages (Halbach, 1989; UNCTAD, 2001). Backward linkages are important to host country development. The following subsections discuss the importance of backward linkages, their development, their benefits to both foreign affiliates and local suppliers, their effect on the performance of local firms, while the final subsections discuss the backward linkages as a channel for technology transfer.

2.8.1 Choices of procuring the materials and intermediate products

In general, a firm has three choices for procuring its inputs of materials and intermediate products for its operations (see figure 2.1).

Figure 2.1 Strategic options for foreign affiliates with regard to obtaining inputs
Source (World Bank report 2001, p.133)



First, it can produce these inputs for itself in one of its own units. Second, it can purchase the inputs of materials and components from independent suppliers through conventional, arms-length, market transactions. The second practice typically occurs when the producer uses relatively simple and standardised components (Battat et al., 1996). Or third, it can procure them through longer-term collaborative relationship with suppliers. This is more typical when final products include inputs custom-tailored to the needs of the final producer (UNCTAD, 2001). Subcontracting for the production of specialised inputs requires more regular and intensive inter-firm relationships (Battat et al., 1996).

According to Ernst and Kim (2002), the suppliers are usually selected by three criteria: a solid financial standing; high ratings on a quarterly scoreboard measuring performance in delivery, quality etc., and speed of response. They argue that the latter is of critical importance: suppliers are expected to respond within hours with a price, delivery time, and a record of their recent performance on reliability and product quality. This implies that local suppliers can only upgrade or perish. The choice of the firm between these alternatives depends upon price, quantity and quality of inputs, the level of mutual trust, and the relations grounded in networks.

2.8.2 Development of backward linkages

However, uncertainty associated with unfamiliarity and risky environment may lead MNCs to act cautiously about what they transfer and how they do it (Duanmu and Fai, 2007). Duanmu and Fai (2007) established a three-stage pathway of relationship development in which the type of knowledge transferred evolve as the relationship and cooperative activities within it deepen. According to Duanmu and Fai (2007, p.450) the three stages are: (a) the initial stage, (b) the developing stage, and (c) the intensifying stage. The dynamics of inter-firm cooperation demonstrate how, with the improvement of the supplier's capability and an increased degree of mutual trust, the relationship changes from being an arm's-length transaction to one that involves the development of firm-specific capabilities (Duanmu and Fai, 2007).

1. Initial stage: at this stage, foreign firms try to find a suitable supply partner, and then if found, start to evaluate the potential local supplier, evaluate the quality of its operation facilities and test some samples of their product. If satisfactory, the relationship will continue to move into the development stage. They suggest, even in such very early stages, that the MNC transfer is explicit and relatively simple technical knowledge given to the new supplier. This may be embodied in product blueprints and manuals. The end point for this stage could be the satisfactory passing of facilities' inspections and sample tests.

2. Developing stage: at this stage, the local supplier becomes established as a regular supplier to the MNC and the two partners gain familiarity with each other. Therefore, they will be able to express their needs and wants more easily. As inter-firm communication becomes more frequent, the messages conveyed become clearer, the cognitive distance between the two firms decreases and this facilitates more cooperation and importantly, trust. As a result, the skills, techniques and managerial practices in the supplier firm will develop.

3. Intensifying stage: the relationship between the partners at this stage become deeper, the cognitive distance reduces and a degree of mutual trust establishes the potential for deepening into an even closer relationship. This stage, however, characterises significant qualitative change in their cooperation and important technological cooperation. The end of the development stage and the start of the intensifying stage in the relationship are not definitively identifiable by any single event occurrence.

2.8.3 Benefits of backward linkages

Backward linkages or supply linkages are dependent on the extent to which TNCs either import materials and components or procure them from local suppliers (Dicken, 2003). The potential benefits of backward linkages will occur only if the subsidiaries of the TNCs create linkages with local firms. When TNCs do not create such linkages, they remain essentially as foreign enclaves within a host economy. Backward linkages are

important to both foreign affiliates and host country as both of them can gain benefits from these linkages.

Porter (1990) discussed backward linkages from a Business School perspective. Porter's theory of the competitive advantage of nations discusses local suppliers in terms of their importance to reduce lead-times. Porter states that developing domestic suppliers is better than relying only on foreign ones, unless the critical underpinnings of competitiveness are present at home (Porter, 1990). Porter stated also that there is a mutually beneficial relationship between firms that produce final outputs and firms supplying inputs for that output. Porter argues that output firms would benefit from local supplies and local suppliers would also benefit from locating near their customers. As a result, the competitiveness of both can be improved. Thus, the following sub-sections discuss the advantages of linkages to both the foreign and the host country.

2.8.3.1 Benefits to host country

Inter-firm linkages are important for both developing and developed countries, but more important for developing countries, as technological capacity is usually underdeveloped, and the market does not provide the resources for potential suppliers to reach adequate levels of development in technology or management. In this context, Smarzynska (2002) remarked that spillovers through backward linkages would benefit both foreign firms and local suppliers of materials and intermediate products. The benefits are likely to be greater to local suppliers since they tend to be less competitive in world markets and possess less sophisticated technologies than MNCs.

However, the increasing concern about backward vertical linkages arises not for the backward linkages themselves, but due to potential benefits of backward linkages in terms of technology transfer and other spillovers to the host economy. Linkages are important channels for diffusing knowledge and skills between firms. Linkages directly increase output and employment in linked local suppliers. Also, indirect effects on local suppliers' capabilities may be considered more important.

According to the UNCTAD (2001), one of the significant channels through which technology transfer can take place are the inter-firm linkages that foreign firms establish with local firms. Backward linkages of foreign affiliates are crucial for host developing countries because they provide opportunities for production and employment by domestic suppliers. More importantly, they form a direct channel for knowledge and technology diffusion that can support the upgrading of domestic suppliers, technological and other capabilities. The knowledge gained in new technologies by local firms enable them to compete more effectively in broader markets if they are not tied exclusively to a specific customer (UNCTAD, 2001; Dicken, 2003).

However, the rapid growth of technological change increases the importance of spillovers by linkages. The reason, as pointed out by Byun and Wang (1995), is that newly emerging technologies are generally knowledge- and research-intensive, and thus are extremely expensive to develop. Local firms are particularly prone because they are small and financially weak (UNCTAD, 2001), and therefore unable to develop such technology. In addition, this increases the degree of local firms' dependence on the multinationals' technology. Such knowledge spillover is of particular importance for domestic firms that are still catching up with internationally competitive practices.

There is another potentially, additional advantage to host country; this advantage may result from the fact that vertical linkages are achieved through country-specific investments in building up relationships with local firms since backward linkages formation involves cost and effort by foreign firms. Therefore, this may make it more costly for highly integrated foreign firms to leave in the future and thus increase the long-term viability of FDI. In other words, this will increase the "rooting" of TNCs and make them less footloose; they cannot leave so easily (Belderbos et al., 2001; UNCTAD, 2001).

In the case of procuring materials and components locally, this results in expanding activities of supplying firms and may lead to the emergence of a new domestic firm to meet the demand created. Backward linkages can generate additional employment in

supplier firms. As pointed out by Markusen and Venables (1999), inter-firm linkages between multinationals and local suppliers may encourage the establishment and growth of local companies in the same or different sectors in the host country. This could take place because MNCs can foster the development of both local suppliers through expanding their output, and indigenous final good production by lowering their costs for intermediate inputs.

Furthermore, foreign firms may increase the internal demand for materials and intermediate inputs, which can induce changes in the host country's industrial structure. In this regard, Barrios et al., (2005. p. 1762) pointed out that “multinationals' demand for intermediate inputs, some of which will be sourced on the domestic market, can induce changes in the domestic industrial structure and can kick-start the development of local industry”. What is more, the increasing demand on intermediate products by foreign firms may lead to the establishment of new local firms.

In addition, there are many ancillary firms involved in the activities of foreign firms, such as transportation and distribution. These ancillary firms could be expanded as well due to their involvement in such activities. All these, in turn, will contribute to the creation of additional employment that benefits the host country economy. Furthermore, the experience gained in new technologies by local firms due to their linkages with foreign firms may enable them to compete more effectively in broader markets (Dicken, 2003).

However, UNCTAD (2001) argued that the ability of foreign affiliates' linkages to contribute to domestic supplier development is dependent on the markets in which foreign affiliates operate and the incentive that they have to set up internationally competitive operations. It also depends on the capabilities of domestic firms; where these are weak, few linkages will occur.

2.8.3.2 Benefits to foreign firms

With respect to affiliates, Ivarsson and Alvstam (2004, p. 244), stated that “the benefits of local linkages for TNCs arise from the fact that local procurement can lower transaction

costs, allow for closer monitoring and give greater flexibility in changing specifications and developing new inputs”.

However, the quality and price of locally purchased inputs are crucial for the competitiveness of the affiliates, in both national and international markets. The cost of inputs produced locally in developing countries is low due to the labour cost in these countries, which is usually low compared to developed countries. As a result, when the required inputs and components by foreign firms in developing countries are procured locally, this can lower the production costs of foreign affiliates, especially for labour-intensive products; in particular where these inputs are expensive to be imported (UNCTAD, 2001; Ivarsson and Alvstam, 2005).

Also, geographical proximity can yield benefits to foreign affiliates by lowering transaction costs, allowing for closer monitoring and increasing the flexibility in changing specifications and developing new parts (UNCTAD, 1999; Ivarsson and Alvstam, 2004).

Moreover, if they can subcontract directly to local suppliers, they can increase their specialisation and flexibility by making it possible for them to specialise in the core activities in which they are most efficient. In addition, local procurement may contribute to a faster and better adaptation of products to local demand (UNCTAD, 2001, Ivarsson and Alvstam, 2005). Schmitz and Nadvi (1999) indicate backward linkages and supplier-buyer cooperative relationships are associated with frequent information flows, which allow for reduced delivery times, quality improvements and fast upgrading of designs in response to changing demand conditions for final products.

2.8.4 Disadvantages of backward linkages

Not all linkages are useful for a host economy; some may be harmful. For instance, the size and market power of foreign affiliates may play an important role in bargaining between buyers and sellers. Therefore, exclusive linkages with large, monopolistic foreign affiliates can lead to anti-competitive practices and unfair terms and conditions

for suppliers (Altenburg, 2000). Thus, the lion's share of returns will be to foreign firms when they distribute the benefits between them. As a result, this will lead to excessive costs for a host economy. However, UNCTAD (2001) argued much depends on the technological content of activities undertaken by suppliers and the value added by them as well. Suppliers of high value-added and sophisticated products are usually better placed to benefit from linkages than those selling simple products.

Another disadvantage of linkages could arise where local suppliers of sensitive price inputs have to compete with each other by cutting costs, making it difficult for them to raise revenues and pay higher wages. In addition, local suppliers may face, in some cases, a high risk. For example, when affiliates are "footloose" and decide to move to lower cost locations, or when affiliates displace local suppliers by first-tier suppliers that follow the lead firm to a new location. In these cases, local suppliers confront a high risk which could result in closure rather than of lower returns (UNCTAD, 2001).

2.8.5 Backward linkages and the role of government

Given the assumption that inter-firm linkages can create spillover efficiency beneficial to a nation's economic development, governments can play important roles in this process; such as encouraging the creation and deepening of backward linkages by lowering the costs and raising the rewards of linkage formation for both foreign and local firms. The objective is not to create linkages for their own sake, but rather to stimulate linkages that increase the efficiency of production and the diffusion of knowledge and skills at the national level (UNCTAD, 2001).

However, some countries were successful in encouraging the growth of backward linkages such as Singapore, the Republic of Korea, Ireland, and Taiwan (China). According to Battat et al., (1996), the reasons behind their success were the gradual abandonment of protectionist measures. They made continuous efforts to upgrade domestic suppliers' capabilities and maintain strong market incentives, by alleviating constraints in technology acquisition, work training and financing. In addition, some of these countries also initiated special programs that aimed to promote backward linkages

that generate mutual benefits for both local suppliers and foreign firms (Battat et al., 1996).

The technological capability of local firms is a key determinant of their ability to be qualified as suppliers to foreign firms (UNCTAD, 2001). Thus, host countries have important roles to play concerning the technology upgrading of local firms. This will assist local suppliers to create linkages with foreign firms and take advantage of opportunities to advance technological improvement than anticipated by backward linkages. Therefore, the technological upgrading of local supplier firms should be a priority for host country governments in order to encourage the backward linkages creation process. However, upgrading of local firms could be achieved by providing training to local firms' workers or by financial support.

The availability of institutional support is also affecting the process of linkage formation. The availability of public and private providers of financial, technological and training support often play key roles in the process of promoting the development of viable suppliers. In the absence of such of institutional support, domestic firms may be unable to get training or capital needed to improve their products to become competitive (Laaksonen-Craig, 2004; Bengoa and Robles, 2005).

Governments can also play an important role as a facilitator of backward linkages by gathering and disseminating information on linkage opportunities. This will help foreign firms to find the appropriate suppliers, especially if the information includes details about the prices and quality of the materials and components that are available locally with the location of the firms (UNCTAD, 2001).

The willingness of multinationals to transfer technology to local firms is also affected by host country policies. Many countries apply various technology transfer requirements, forcing multinationals to employ a certain level of local labour, make technologies available for local firms, as well as high tariffs in imports required by foreign firms. (Byun and Wang, 1995) (For more details, please see chapter three, section 3.4.5).

2.8.6 Backward linkages and performance of local firms

Linkages formation between foreign and local firms is critical for the success of the local suppliers' operations. In this context, Blomstrom and Kokko (1998) point out, "in the case where firms are inter-linked, local firms may be able to improve their productivity as a result of forward or backward linkages with MNC affiliates [or] may imitate MNC technologies" (p. 248).

Transfer of technology contributes to production efficiency and product quality of firms (Byun and Wang, 1995; Cui et al., 2006). However, the introduction of new technologies in the host country assists local suppliers to improve product quality, reduce production costs and prices which enable them to become competitive, and to be able to compete for market share. Cui et al., (2006) point out that technology contributes to the quality and uniqueness of products, reduces the cost of production, and enhances product differentiation. This will increase market demand and sales. Consequently, cost reduction and quality improvement increases product demand, which in turn contributes directly to firms' financial performance.

At the same time, technology is strongly related to the supporting management activities in a firm (Cui et al., 2006). For instance, information technology improves efficiency of information processing in a firm, which supports management decision-making and strategy implementation. As a result, improved management activities enhance the implementation of effective competition strategies and then contribute indirectly to firm performance (Cui et al., 2006).

According to Cui et al., (2006), technological assistance by foreign firms to their local suppliers allow local suppliers to provide their clients with high quality products with reasonable prices, which is key to foreign firms building competitive advantage in the market, enabling local firms to make needed modifications of the product to meet the requirements of foreign firms.

2.8.7 Determinants of backward linkages

The creation of backward linkages depends upon the extent to which the subsidiary is integrated into the parent company structure (Dicken, 2003). Therefore, TNCs that are strongly vertically integrated at a global scale are less likely to develop local supply linkages than firms with a lower degree of corporate integration. Even where vertical integration is low, the existence of strong linkages with independent suppliers in the TNC home country or elsewhere in the corporate network may discourage the development of new ones, particularly where local suppliers are perceived to be less reliable or of lower quality (UNCTAD, 2001; Dicken, 2003). However, it has been found that “Foreign affiliates tend to be in a different position from local firms: they come with international supply chains and with established suppliers that know their technical, quality, scale and cost needs and have the capability to keep up with changing technologies. As a result, TNCs often find it economical to import inputs from these suppliers rather than buy locally” (UNCTAD 2001:133).

A particularly important factor is the role of the foreign plant itself in the TNC’s overall strategy; that is, whether it is an export platform activity. Foreign plants that serve the host market are more likely to develop local supply linkages than export platform plants (UNCTAD, 2001; Dicken, 2003). (Please see section 5.5.1.4 chapter 5 for more details)

Evidence in previous literature states the lack of efficient domestic suppliers was the key obstacle in the creation of linkages with domestic suppliers (e.g. Halbach 1989; Iman and Nagata, 2005). For example, Iman and Nagata (2005, p. 408) find that the key factor behind the low level of local procurement was that the production capacities and technological capabilities of local firms did not meet the required foreign firms’ specifications. More importantly, studies revealed that most foreign firms complained of significant technological and managerial gaps between themselves and local supplier companies, which prevented the latter from meeting the needs and requirements of the former. Moreover, it has also been found that foreign firms complained about an inadequate response from local suppliers regarding the following requirements: competitive price, quality control, time on delivery (keeping promises), flexibility and

speed to change designs/production, ability to design parts and components, and long-term commitment (Battat et al., 1996 and Freel, 1999).

Smarzynska (2002) argues that the extent of backward linkages between multinationals and local suppliers of intermediate products is likely to depend on the technological requirements of the former. If MNCs possess much more sophisticated technologies than local firms, and require much more specialised and complex intermediates, they will not be able to source them in the host country. It is then possible that this problem may be resolved by providing technical assistance to expected suppliers.

Belderbos et al., (2001) examine the determinants of backward vertical linkages established by multinational firms in a host economy. They found that host country factors promoting vertical linkages are the quality of infrastructure and the size of the local components supply industry, while restrictive trade policies have a detrimental effect. Local contents regulations have a positive impact but do not stimulate procurement from locally owned suppliers. In addition, Turok (1993) investigated local sourcing by foreign-owned firms in the Scottish electronics industry. The results show that the level of vertical linkages is low.

Furthermore, the opportunity for imported intermediate inputs would impede the extent of backward linkages (Alfaro, et., al, 2010). Evidence revealed that one of the impediments to the development of backward vertical linkages with Mexican suppliers were US and Mexican tariff (exemption) policies, which gave US investors important incentives to import components from the United States. Other major impediments include the export orientation of foreign plants, which was incompatible with the traditional domestic market orientation of suppliers, the lack of proximity of Mexican suppliers to the clusters of foreign investors at the Northern border, and a lack of plant-level autonomy concerning purchasing decisions.

2.8.7.1 Changes in MNCs' strategies

There are several opportunities for developing country suppliers to improve their technological competence through creation of local linkages with foreign affiliates. In recent decades, these opportunities decreased due to a change in the international strategies of many MNCs (Dunning, 2000; Narula and Dunning, 2000; UNCTAD, 2001; Ivarsson and Alvstam, 2004). For example, the level of technological capabilities and other performances demanded by TNCs of their local suppliers has grown to a large extent (Ivarsson and Alvstam, 2004). The traditional “follow-source” suppliers may affect the linkages creation process by MNCs with local suppliers since they enjoy economies of scale in production and design, and this may encourage MNCs to stay with them when setting up manufacturing operations in new locations. Therefore, domestic suppliers face tougher competition from international supplier companies that follow their MNC customers abroad. Thus, the traditional “follow-source” suppliers may consider it an obstacle to the linkages creation process with local suppliers. Therefore, local suppliers have to compete against suppliers overseas to become successful suppliers to foreign-invested firms. Furthermore, as international competition intensifies, domestic companies would have to also seek out international opportunities. In this context, Ivarsson and Alvstam (2004) found that most of the local procurement by TNCs in developing countries is from their traditional “follow-source” suppliers. Furthermore, they indicate that there is a clear trend for design and research and development to be centralised in parent companies in order to facilitate the development of common products and processes, and to exploit economies of scale. These findings, as emphasised by Ivarsson and Alvstam (2004), mean foreign firms in developing host countries tend to be less sophisticated in terms of product development, and tend to focus on production and assembly activities that seem to have a lower potential for technology spillovers to local firms.

2.8.8 Backward linkages as a channel of technology transfer

Inter-firm linkages with domestic firms are one of the important channels through which technology is transferred (UNCTAD, 2001; Smarzynska, 2002; Dicken, 2003).

Multinationals have an incentive to prevent knowledge and technology leakage that would improve the performance of their local competitors, but at the same time they are likely to benefit from knowledge transfer to local firms in upstream sectors, as they benefit from the improved performance of intermediate input suppliers (Smarzynska, 2002; Decken, 2003; Javorcik, 2003; Javorcik and Spatareanu, 2008). Therefore, spillovers from FDI are most likely to be vertical than horizontal in nature. In this context, Dicken (2003, P. 284) emphasises that “the very nature of the TNC may inhibit the spread of its proprietary technology beyond its own organisational boundaries. Possession and exploitation of technology are inherent features of the TNC”. Accordingly, spillovers are more likely to occur through backward linkages with local suppliers, which take place through contacts between domestic suppliers of raw materials, processed materials and intermediate inputs and their MNC clients. The above argument is confirmed by Smarzynska (2002), who found empirical evidence that spillovers took place through backward linkages but did not find any indication of spillovers occurring through horizontal channels. It is then plausible that spillovers from MNCs presence in upstream sectors exist due to the provision of inputs.

In most developing countries, local suppliers are relatively weak in technological terms (UNCTAD, 2001). As a result, the ability of local suppliers to meet the requirements of MNCs and to ensure efficiency in production may be difficult due to the equipment they have or possibly due to lack of funds. However, it has been found that TNCs often need to provide their suppliers with a variety of technical specifications as well as with assistance in numerous areas (Lall, 1980; Halbach, 1989; Dunning, 1993; Dicken, 2003; Giroud, 2000; UNCTAD, 2001; Dicken, 2003; Ivarsson and Alvstam, 2004; Javorcik, 2003). These assistances enable the latter to overcome the problems associated with the development process. Consequently, this will allow local suppliers to provide their buyers with high quality inputs for the competitiveness of affiliates. At the same time, if local firms are able to accomplish the requirements of multinational customers without any assistance, the scope for learning may be limited (Smarzynska, 2002). Crone and Rober (2001) argue that foreign firms are willing to transfer knowledge only when they

perceive themselves gaining benefits, such as improved quality and services or reduced costs.

Technological assistances can be categorised into two main categories: product-related technology and process-related technology (Giroud, 2003; UNCTAD, 2001; Ivarsson and Alvstam, 2004). Product-related technology transfers include the provision of proprietary product know-how; product designs and technical specifications; regular feedback on product performance; and technical consultations with suppliers to assist the latter to implement and master new technologies. Process-related technology transfers include the provision of modern machinery and equipment to suppliers, technical support in product planning, quality management, inspection and testing, and advice on tooling, maintenance, production layout and operations. MNCs can provide their suppliers with assistance in purchasing raw materials and intermediate inputs and even finding additional customers. TNCs can also transfer organisational and managerial know-how, for example, on inventory management, delivery and logistical systems. TNCs may also offer training to their suppliers and assist them by sharing business information, not only their own business plans, but also general technical, market and business matters (Ivarsson and Alvstam, 2004, P. 243-244).

Most previous studies on inter-firm knowledge and technology transfer take place within a single country setting rather than across borders (Duanmu and Fai, 2007). Numbers of case studies found that multinationals are willing to help local suppliers establish a position in the market by providing technical assistance, financial aid, managerial advice, and marketing information (e.g. Lall, 1980; Halbach, 1989; Ivarsson and Alvstam, 2004). Javorcik (2004) argued that the most important channels of backward spillover are direct knowledge transfer from MNCs to their suppliers; higher requirement by multinationals for product quality and on-time delivery; as well as the fact that multinational entry can increase the demand for intermediate goods.

Lall (1980) empirically examined two Indian truck manufacturers and found important backward linkages. Lall notes that MNCs may contribute to increased productivity and

efficiency in other firms as they: assist prospective suppliers, domestic or foreign, to set up production facilities; provide their suppliers with technical assistance or information, which will help them to raise the quality of their products and to facilitate innovations; assist their suppliers in the purchasing of raw materials and intermediaries; provide training for their suppliers, help in management and organisation, and help them diversify by finding additional customers.

Furthermore, Ivarsson and Alvstam (2005) found that Volvo provides its domestic suppliers with technological assistance, enhancing them to improve their operations. Their findings also show that the long-term relationship is important in inter-firm learning. Ivarsson and Alvstam (2004) also revealed that both domestic suppliers and the follow-source suppliers seem to improve their internal capabilities from the technological assistance provided by Volvo as part of their business relationships, not to mention that even a simple assembly operation by Volvo seemed to generate important linkages and technological upgrading among domestic suppliers, enhancing the latter's domestic and international market position. Furthermore, Smarzynska (2002) found empirical evidence that spillovers took place through backward linkages but did not find any indication of spillovers occurring through horizontal channels.

Crone and Roper (2001) examined the incidence of various activities that might facilitate the transfer of knowledge from MNCs to their suppliers. Their findings show that there is substantial scope for local learning by the suppliers of MNCs plant, and show also that many of these MNCs are engaged in a range of knowledge transfer activities with their suppliers. They argued that knowledge transfer by foreign firms is only likely to occur where MNCs perceive some benefits, such as improved quality and services or reduced costs.

Craig and Degregori (2000) examine the transfer of technology from Japanese automobiles in the USA to local firms. One of their findings indicated that "the close working "partnership" of Japanese automobile firms with their domestic suppliers has been an effective mechanism for technology transfer to these firms. The close

relationship has made the domestic suppliers more competitive, domestically and internationally, and facilitated an increase in production efficiency. This close cooperation helps suppliers to improve the quality of their output” (p. 407). They argued that the most important mechanism of technology transfer is the direct interaction among firms. Furthermore, Kugler (2006) investigated empirically whether foreign direct investment (FDI) in developing countries generates positive externalities on local producers. The findings reveal that outsourcing relationships of MNCs with local upstream suppliers is the channel of diffusion.

2.9 Summary

This chapter provided the definition of the main terms relevant to the present study. The concepts related to the relationships between suppliers and buyers were reviewed as well. This chapter also discussed the impacts of FDI on the host country, based upon previous studies, with more focus on the transfer of technology through backward linkages that foreign firms create with local suppliers. The benefits of FDI to the host country are presented. The role of multinational corporations in the area of technology transfer is discussed also. The explanations of the concepts of inter-industry and intra-industry spillover and the description of the various forms that spillover can take, both within and between industries are dealt with as well. Backward linkages, their importance, their development, their benefits to both foreign and local firms, their determinants, and their role as a channel of technology transfer are discussed as well in this chapter. The chapter concludes with a brief summary.

Chapter Three

Host country investment environment-the case of Jordan

3.1 Introduction

The impact of MNCs on host countries results from the interplay between the level of economic development and the capacity of firms and countries to absorb, generate and diffuse technological competence (Blomstrom et al., 2000; Dunning, 2000; Narula and Dunning, 2000; World Bank, 1998). Accordingly, the impact of MNCs is most likely to vary from one host country to another and from one industry to another as well according to the host countries economic development, characteristics, and their policies towards FDI. Therefore, it is necessary to discuss the host country's business environment in which MNCs operate, which might have an effect on the impact of MNCs on a host country, particularly the creation of backward linkages with local companies. The business environments of host countries could decrease or increase the benefit of the host country from the operations of foreign firms, especially the formation of the backward linkages process.

This chapter aims to provide a background about the investment environment of the host country, focusing on the investment environment of Jordan, in which foreign firms establish and operate which may have an effect on the formation of backward linkages and transfer of technology.

The chapter includes the following sections: Section Two provides background about Jordan. Section Three discusses the determinants of FDI inflows, and changes in location advantages will be looked at as well. Section Four discusses some of the characteristics of the host country, which might have an effect on the impact of MNCs on a host country, particularly the creation of backward linkages and consequently the transfer of technology to local economy. Section Five discusses government policies toward FDI. Section Six discusses the free trade agreements that Jordan has conducted with other countries and statistics about FDI inflows to Jordan. Section Seven discusses the incentives provided to foreign investors, Jordan Investment Board, FDI inflows, and privatisation programme. Section Eight discusses the clustering of foreign firms,

including, Qualified Industrial Zones (QIZs), Industrial Estates (IEs) and Free Trade Zones (FTZs). Section Nine discusses the sources of technology to developing countries. Finally, this chapter ends with a brief summary.

3.2 Background about Jordan

Jordan is a developing country which lies in the Middle East region. It is located in the middle of the Arab homeland near the Mediterranean Sea. In comparison with other Arab countries, it has a very small area of about 90,000 square kilometres. The eastern and most of the southern part are desert, with arable land forming only seven percent of the total area (Ahlawat and Billeh, 1996).

One of the most important motivations for the Jordanian government to attract FDI inflow was, and still is, to improve Jordan's overall level of technology. Furthermore, Jordan is an economy with a very high unemployment rate, suggesting that positive indirect employment effects are likely to result from linkages between MNCs and local supplier firms. However, Jordan's government is aware FDI can provide a package of external resources for economic development; thus, attracting FDI is at the top of the government's agenda. Jordan has undertaken the implementation of a significant number of laws, reforms in trade liberalisation and investment promotion to improve the business environment, and hence is attracting foreign investors. Key reforms have been undertaken in the information technology, pharmaceuticals, tourism, and services sectors. The main aim has been to encourage foreign investment and to transform Jordan into an outward-oriented, market-based economy competitive in the global marketplace.

3.2.1 Jordanian economy

The sources of external financing for the developing country were foreign aid from governments, lending by commercial banks, loans from the World Bank, access to the country's drawing rights in the International Monetary Fund (IMF) and private foreign investment (FDI and portfolio investment). While the first four sources of foreign capital have declined, FDI has become an important source of private external finance for developing countries (Mallampally and Sauvart, 1999).

Jordan's economy was dependent on the input of external capital, including foreign assistance and remittances from Jordanians working abroad. During the 1970s and early 1980s, Jordan received a substantial amount of foreign currency remittances from its thousands of expatriates working in the Gulf countries. The bulk of the money was spent on building infrastructure. Jordan faced serious economic problems in the late 1980s when promised assistance from Arab countries failed to materialise. At the same time, the Jordanian government borrowed heavily against the anticipated assistance and spent most of the money on developing infrastructure. In 1988, it became clear the pledges would not be fulfilled, and this has placed Jordan in a difficult situation.

Until 1989 the economic policy strategy of Jordan was inward looking with an emphasis on import substitution supported by a high tariff on its imports. Since then, the strategy has been changed in the direction of a more outward looking strategy characterised by attempts to stimulate exports by reducing the import tariffs and the removal of several import quotas (Risager, 1995).

The Gulf War crisis in August 1990 resulted in Jordan being deprived of its main export markets, which include, among others, Kuwait, which was under siege, as well as Iraq, which was placed under international sanctions. The trickle of Arab aid dried up completely and more than 320,000 expatriates returned to Jordan from the Gulf nations, causing a loss of the expatriate remittances which had previously been a major source of foreign exchange.

The resulting situation imposed severe limitations on the Jordanian economy. It severely constrained the Kingdom's ability to develop its infrastructure, led to a jump in its unemployment level, and caused a difficult situation for industries that depended on the Iraqi, Kuwaiti and other export markets in the Gulf. Jordan's economy started to recover in 1992 and 1993 due to an inflow of investment for construction starts and industrial ventures, largely from returnees from the Gulf. While Jordan still suffers from a

significant debt burden, it has met or surpassed most structural adjustment targets set by the (IMF), and its currency, the Jordanian Dinar, has been stable since 1989.

One of the most serious economic problems in Jordan is a high unemployment rate. Unemployment is concentrated among the young. The resulting waste of human resources is further compounded by the fact that the unemployed tend to be relatively well-educated. High unemployment is reflective of the slow employment growth against a rapidly rising labour force due to the young age of the population (OECD, 2006).

Jordan is reaping economic rewards as a result of the regional peace process. The Kingdom saw more investment after the regional peace process. The peace treaty between Jordan and Israel, coupled with Jordan's skilled, low-cost labour force, established the Kingdom as stable and attractive for investments. Due to the above difficulties, the government paid more attention to attract foreign investment and committed to improving the country's infrastructure in order to support new investments and continual economic growth (<http://www.infoprod.co.il/country/Jordan1c.htm>).

Jordan started to rebuild itself for the new future. Jordan faced a lack of own funding to support and develop production. It widely realised that foreign capital was needed, particularly after the decline of its previous source of external financing. Due to the fact that FDI is a more stable form of funding than either development assistance (aid) or loans, the Jordanian government made a lot of effort to attract FDI as it was expected, in the long run, to solve the lack of capital, to absorb unemployment, to mitigate the external debt problem in Jordan, and to bring advanced technology.

3.3 Determinants of FDI inflows

FDI in recent years has grown significantly throughout the world. However, most of the FDI transactions were between developed countries. Despite the efforts made by developing countries to attract FDI, and despite the fact that FDI is increasingly important to developing countries, developing countries face difficulties in attracting FDI

and their share in the last few years, except China, has been declining (Lorena and Valerija, 2006).

However, the growth of FDI has been accompanied by changes in its geographical locations, indicating shifts in the investment climate in host countries and in economic factors driving the location of international production. Some new locations have become attractive to FDI relative to the old ones, which leads to the relocation of activities across countries by direct investment. However, these changes have important implications for host countries. As determinants of location are changing, countries can change their ability to receive FDI and to modify its contributions (UNCTAD, 2001)

Host countries are aware that FDI can provide a package of external resources for economic development. Jordan is one of these countries in which they strive to establish business-friendly environments and implement FDI inducing strategies. However, the decision by foreigners to invest in a given country depends on a wide range of factors in the host country. The most basic ones are political and economic stability and a welcoming environment for FDI. Other important factors are market size, the economic growth of the host country, natural resources endowments, quality of workforce, ease of entry and exit, appropriate standards of treatment and dispute settlement, effectiveness of FDI promotion, transparency, liberalisation (trade openness and export orientation), human capital, geography, corruption, taxation, cultural links and cultural heritage, rule of law, and quality of physical, financial, and technological infrastructure (Lorena and Valerija, 2006; Balamoune-Lutz, 2004; UNCTAD, 2001).

The main traditional factors in FDI location are large markets, the possession of natural resources and the presence of cheap, unskilled or semi-skilled labour (UNCTAD, 2001). However, these factors are still important. In this context, Maria and Anuta (2009) found that market size and potential, reform progress, business liberalisation, and labour cost are the main determining factors of evolution of FDI in Romania.

The determinants of location according to UNCTAD (1999) are: policy liberalisation, rapid technical progress particularly in transport, communications and information, and new management and organisational techniques. The liberalisation of FDI regimes and the strengthening of international standards for the treatment of foreign investors allow firms greater freedom in making international location decisions and in choosing the mode for serving each market, while new transport, communication and information technologies allow firms to spread and manage international operation more efficiently (UNCTAD, 2001).

Ersoy and Kok, (2009, p.106) emphasise the role of the following factors as the most important factors based on which an investor selects a location for a project: “these include the factors affecting the availability of local inputs such as natural resources, the size of the market, geographical location, the position of the economy, the cultural and political environment, factor prices, transport costs and certain elements of the economic policy of the government (trade policy, industrial policy, budget policy, tax policy, etc.)”

Another factor recently introduced as one aspect among the determinants of FDI location is the level of corruption in the host country (Al-Sadig, 2009). Transparency and accountability of governments are essential conditions for providing a trustworthy, effective, and attractive business environment (Ersony and Kok, 2009). However, as Al-Sadig (2009) argues, the level of corruption in the host country increases the cost of doing business in host country and consequently reduces the profitability of the foreign firm. Accordingly, investors will take this factor into account in making decisions to invest abroad.

Perry (2000) argues that FDI flows are to some extent determined by the effectiveness of the host country’s legal system. The right domestic policies and conditions such as political stability, transparent and accountable government and the prevention of corruption are crucial in order to attract foreign investment.

Foreign Direct Investment (FDI) is usually carried out by foreign firms in order to earn profits. The profitability of FDI is expected to decrease with increases in taxation. Thus, the role of taxation will be taken into account when making the decision regarding location. In this context, Bellak and Leibrecht (2009) conducted a study to estimate the role of taxation as a determinant of FDI in Central and East European Countries, and their findings indicate that tax-lowering strategies of Central and Eastern European Countries governments have an important impact on foreign firms' location decisions. They also found that FDI is positively related to both the source country and host market size as well as to progress in privatisation.

The speed of which technology changes also plays an important role on the location decisions of the MNCs. The speed of technology changes obliging MNCs to constantly improve their technologies to retain competitiveness, and the increasingly information-based nature of technology require new sets of skills and infrastructure to exploit new technologies. Therefore, location decisions depend on the ability of host countries to provide the needed complementary skills, infrastructure, suppliers and institutions to operate technologies efficiency (UNCTAD, 2001, p.8).

Lorena and Valerija (2006) conducted a study to identify the main determinants of FDI in Southeast European Countries. Their findings suggest that certain variables such as privatisation and the trade regime, as well as the density of infrastructure, appear to be robust under different specifications.

However, as Lorena and Valerija (2006) stated, the identification of the determining factors of FDI is a complex problem due to the fact that it depends on several characteristics specific to each country, sectors, and companies.

3.4 Characteristics of the host country

The linkage process is affected, to a large extent, by a host country's overall policy environment, including its economic and institutional framework, the availability of human resources, infrastructure, and the degree of political and macroeconomic stability

(UNCTAD, 2001). Host developing countries vary in terms of their characteristics, economic development, technological capability, and their policies toward FDI and so on. As a result, one is likely to find denser and extensive network of linkages between MNCs and domestic firms in developed economies than in the developing economies.

Due to the importance of the level of development of the host country, this section will discuss the investment environment of the host developing countries that MNCs operate in. Therefore, the following sub-sections discuss some of the major determinant factors related to host country economic development, including its absorptive capacity to implement and master new technology, human capital and the development of financial markets.

3.4.1 Availability of local suppliers

A firm has several options for obtaining inputs. It can import them, produce them locally in-house or obtain them locally from foreign or domestic suppliers. Therefore, if local suppliers are not available, with competitive costs and quality, foreign firms will produce them locally in-house or stay with previously established suppliers. In particular, this occurs when the decision of foreign firms relates to source sophisticated and complex parts and components, as foreign firms usually come with international supply chains and with established suppliers that know their technical, quality, and have the capability to keep up with changing technologies (UNCTAD, 2001). The decision of foreign firms to source the parts and components either from local suppliers or from a preferred supplier outside a host country depends basically on the capabilities of local companies. Thus, one of the most important host country factors influencing linkage formation is the availability of local suppliers with competitive costs and quality. However, this is associated with a country's level of development (UNCTAD, 2001).

Another major issue is the suppliers' lack of a strong attitude toward continuous improvement, especially a commitment to upgrade quality on the part of suppliers; this issue has been considered by some as more important than the actual level of quality at any given point in time (Belderbos et al., 2001; UNCTAD, 2001).

3.4.2 Absorptive capacity

It is assumed that technology leaks from multinationals to host country firms. However, such leakages do not occur automatically. The learning process is costly and time consuming because mastering a technology is an active process and this requires, for example, information collection, reverse engineering, and personnel training for new production methods (Byun and Wang, Y, 1995).

A host country's technological capability, in terms of a well-educated workforce for example, can determine the level of technology transferred. The technological and managerial capabilities of domestic firms, in terms of a well-educated workforce for instance, determine to a large extent the ability of a host economy to absorb and gain benefits from the knowledge that linkages can transfer (Byun and Wang, 1995; UNCTAD, 2001). In this context, Teece (1976) found that the cost of transferring specific technologies decreases as the host country's capability to absorb technology increases. However, it has been argued that the more technology is transferred, the more advanced the recipient country or firm will become (Byun and Wang, 1995, P. 203). It has been argued that techniques that can be adopted from general knowledge in manufacturing activities generally require less absorptive capacity than a specialised high technology process (Kugler, 2006).

The technological gap between foreign firms and local firms may affect the transfer of technology. In this regard, Saggi (2002) argued that the technology gap between domestic and foreign firms in final goods sectors is likely to have an affect on the sourcing patterns of multinationals. Saggi shows that backward linkages are likely to benefit domestic producers of intermediates only in the presence of moderate gaps in technology between domestic and foreign firms. Furthermore, Smarzynska (2002) found that the initial technological gap between foreign and domestic suppliers does not inhibit spillovers, and firms which possess limited exporting experience are more likely to benefit from backward linkages.

In the case of existing strong linkages with local suppliers with weak capabilities of a host country to observe these technologies, it is likely to find weak transfer in spite of existing strong linkages, and vice versa. Furthermore, Alfaro et al., (2010) indicate that a country's capacity to take advantage of FDI externalities might be limited by local conditions, such as the development of local financial markets or the educational level of host country. Thus, the following sub-sections discuss these conditions.

3.4.3 Human Capital

Human capital is essential for the domestic firm to improve productivity and to implement technologies brought by FDI. High levels of human capital also helps domestic firms in searching for new and efficient technology, and in competing in a competitive environment created by the presence of FDI. In this context, Borensztein et al., (1998) argue that although FDI brings technologies that can contribute to the economic growth in developing countries, the implementation of these advanced technologies requires the presence of a sufficient level of human capital in the host country. The growth rate of developing economics is highly dependent on the extent to which these countries can adopt and implement new technologies (Findlay, 1978 and Borensztein et al., 1998). They also argue that the main contribution of FDI is to the technological progress of host countries.

Borensztein et al., (1998) show that the technology brought by FDI leads to higher growth only when the host country has a minimum threshold of human capital stock. Therefore, FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies is available in the host country. Furthermore, Alfaro et al., (2010)'s results highlight the critical role of human capital in allowing growth benefits from FDI to take place. Human capital can thus play a critical role in the impact of the FDI in the technological progress of the host country for many reasons. Firstly, the amount of human capital in the country must reach the level necessary to implement and operate technologies brought by FDI. Local engineers, technicians, and workers should be able to work with new technology or at least are able to learn in order to work with it. In other words, new technology can be implemented only when the

labour force has built up the corresponding skills. Secondly, the costs incurred for foreign firms may be too high for them to get engaged in local supplier development activities (UNCTAD, 2001). Thus, the cost of foreign labour or training local workers might discourage foreign firms from bringing in capital goods with modern technology. Consequently, inadequate human capital could limit the transfer of advanced technology and knowledge by FDI, and then limit the contribution of FDI to economic growth. Thirdly, human capital is essential for the domestic sector to improve its technological progress with spillover effects from FDI. Through linkages, domestic firms can improve their productivity and technological level when FDI firms help them to set up production facilities, provide technical assistance to improve the quality of products, assist in purchasing raw materials, and provide training and help in management (Blomstrom et al., 1994). The implementation and adaptation of new technology brought by FDI depends considerably on their stock of human capital. Human capital is therefore a key factor in the technology diffusion process from FDI.

The decision of FDI firms to establish linkage with domestic firms also depends essentially on the technological capability of the latter, which in turn depends on its human capital. Consequently, domestic firms should be able to implement and operate at the technical level necessary to their products to meet the requirements of FDI firms.

According to Jaradat (1992), the Jordanian economy relies heavily on skilled and educated workers. The educational system is considered to be crucial to the production of skilled and qualified graduates for the employment market in the Gulf co-operation council. Accordingly, the development of human resources is one of the main priorities of the Jordanian government. In the 1980s, in view of the rapid technological advances taking place, there was a growing awareness of the need for educational reform to provide an educational system capable of developing the various economic, technological and social needs of the country. This reform was carried out by changes to the education system in 1987 (Jaradat, 1992).

3.4.4 Financial system

Some level of financial system development is needed to encourage more efficient investment and enables domestic firms to realise their investment plans when they need to invest to upgrade their own technology or adopt new technologies. Hermes and Lensink (2003) argue that the financial system is a crucial characteristic of the environment in a host country; and in order to maximise the technological contribution of FDI is the development of a domestic financial system. Alfaro et al., (2004) provide evidence that only countries with well-developed financial markets gain significantly from FDI in terms of their growth rates. Furthermore, Azman-Saini et al., (2010) find that the positive effect of FDI on growth ‘kick in’ only after financial markets’ development exceed a threshold level.

Villegas-Sanchez (2009) cited in Alfaro et al., (2010) using firm level data from Mexico, shows that domestic firms only gain productivity increase from FDI if they are located in financially developed regions. Villegas also shows that domestic firms located in regions where accessing credit is more difficult will experience a negative spillover effect from FDI. As Alfaro, et al., (2010) argue that for a firm to operate in the intermediate input sector, entrepreneurs have to produce a new variety of intermediate input, and this requires upfront capital investment. The more developed the local financial markets, the easier it is for credit constrained entrepreneurs to set up their own firms. When the number of varieties of intermediate inputs increases, this leads to positive spillovers to the intermediary process that constitute the final goods sector. As a result, financial market development assists the backward linkages creation process between foreign and domestic firms. They also argue that the lack of development of local financial markets can limit the economy’s ability to take advantage of potential FDI spillovers because the limited access to credit markets restricts entrepreneurial development (Alfaro et al. 2010).

3.5 Government Policies toward FDI

There has been a significant shift in attitudes toward FDI in developing countries. The shift of appraisal of FDI from negative to positive is found more strikingly in government

attitudes of developing or transition countries toward FDI. In the past, many governments saw FDI as part of the “developing problem”; but today, FDI is seen as part of the solution (UNCTAD, 1999). This shift in attitude took place due to the package of potential positive impacts on host country when MNCs establish a subsidiary overseas, such as employment generation, financial, technological, and managerial impacts that together have far-reaching implications for the host economy, especially for developing countries (Dicken, 2003). As a result of these potential positive impacts, most countries have removed their barriers to foreign direct investment (FDI), and have made substantial efforts to attract foreign investors. Consequently, great emphasis has been placed on highlighting the benefits of FDI to these countries. The spillover effect has been identified as an important channel through which domestic firms benefit from FDI. With this realisation, and with the growing role of MNEs in economic life in most countries, most developing country governments have formed agencies to promote private, rather than public capital flows as catalysts of long-term development. This has prompted governments to encourage FDI inflows; therefore, the competition among governments to attract FDI has grown significantly, and many countries have not only reduced or eliminated such restrictions, but also encourage FDI with tax and other incentives (UNCTAD, 1999; Chakrabarti, 2003; Lall and Narula, 2004; Ersony and Kok, 2009).

Most of the developing countries tend to suffer from shortages of a firm’s capability to provide groundbreaking scientific knowledge which would allow them to compete in the international marketplace. This lack of technology constitutes the obstacle behind further economic progress and growth. When MNC make FDI in developing countries, they provide them with possibilities for accessing this much- required technology. For this, many developing countries implement policies to attract multinational corporations to invest within their national boundaries for the purpose of gaining access to modern technology. Host countries hope to gain access to technologies they cannot develop by themselves. Thus, a great concern for today’s policy makers is how to best exploit this intangible asset possessed by MNCs for the benefit of a host economy.

Governments in developing countries are increasingly seeing FDI as a tool for stimulating improvements in the products and services of local firms. Host country policies affect the creation of backward linkages in different ways. Thus, many developing countries implement policies to attract FDI for the purpose of gaining access to modern technology. Appropriate domestic policies will help attract FDI and maximise its benefit, while at the same time removing obstacles to local businesses (Ersony and Kok, 2009). By inviting multinational corporations (MNCs) to invest within their national boundaries, host countries hope to gain access to technologies which they cannot develop themselves.

The extent to which foreign direct investors establish backward vertical linkages with host country suppliers has been a focus of policy concern in both developing and industrialised countries. Therefore, policy makers increasingly seek to promote the linkages creation process, hoping that these linkages will lead to development of its local firms by generating additional economic activities and income and the transfer of technological and management skills to their countries, and gives many of their local suppliers a foothold in international markets that may eventually enable them to compete worldwide for other customers (Battat et. al 1996). However, many countries apply various technology transfer requirements in order to achieve these potential benefits, obliging multinationals to employ a minimum level of local labour, make technologies available for local firms, restrict imports, or use local suppliers. These requirements increase the cost of certain types of technology transfer, and therefore, decrease the import of technology. For instance, governments who encourage foreign affiliates to establish business linkages with local firms have implemented local content requirements.

In general, a host country's policies with respect to restricting or welcoming FDI would obviously affect the magnitude and character of FDI. Not only would the policies have a direct effect on FDI, but they would also affect whether the foreign firm wishes to export or license instead of having a direct production investment in the foreign country. These policies aim to satisfy various objectives, such as reducing or increasing FDI, influencing

its geographical origin, encouraging specific contributions to the economy and affecting ways in which these contributions are made (UNCTAD, 1998). Countries with better policies have been found to have had greater success in attracting foreign inflows; this could partly be because improved policies raised the marginal product of new investment, and also reduced the risk of holding domestic assets (Mody and Murshid, 2005).

For over twenty years, the Jordanian government has encouraged inward foreign direct investments in the hope that it will contribute to reduction of unemployment and increase the competitiveness and productivity of local industries. The realisation of this hope, however, depends upon the assumptions that knowledge and technology could be transferred from foreign firms to local firms. During the 1990s, Jordan based its industrialisation strategy on attracting FDI, which was believed to have greater potential for spillover.

The Investment Law (2003) and the Investment Promotion Law (IPL) (1995) regulate FDI in Jordan. Under IPL, foreign and domestic firms have equal treatment in regards to tax benefits. IPL provides tax exemptions on fixed assets (imported in the country within a three year period) and spare parts (if these are less than 15% of fixed assets value) during the creation and expansion of projects.

3.5.1 Local content requirements

The host country government plays a very important role in motivating local linkages by insisting that TNCs utilise a certain level of local source material and components to avoid the establishment of multinational enclaves with little or no relationship to the local economic environment (UNCTAD, 2000). Such local content policies have become increasingly widespread in both developed and developing countries. This was particularly the case with MNCs in the raw materials and manufacturing sectors. The governments' hope was that, as a result, this strategy will lead to many benefits to the host country, such as expanding national industrial capacity, thereby increasing local value added, generating employment and, ultimately, raising the standard of living. However, this policy depends on the relative strength of the host country's bargaining

power vis-à-vis the TNC; and on the extent to which local suppliers are of an appropriate quantity and quality to be able to meet the requirements of TNCs (UNCTAD, 2000).

Studies of the effects from this strategy show mixed results. Evidence suggests that local content requirements contributed to the development of suppliers' industries in some countries such as Taiwan, Brazil, Mexico and Thailand before the 1990s (UNCTAD, 2000, 2001). Halbach (1989) found that local content and other market reservation schemes had a positive influence on the development of domestic suppliers to foreign affiliates geared towards domestic markets (Halbach, 1989). Turok (1993), on the other hand, conducted a study to investigate local sourcing by foreign-owned firms in the Scottish electronics industry, and his findings show low levels of vertical linkages. He suggested that sourcing rates would have been even lower in the absence of EU local content requirements.

As Kelegama and Foley (1999) argue, when local suppliers are weak and uncompetitive, forcing backward linkages through local content requirements can lead to high cost production of low quality finished products. Sometimes local suppliers may not exit at all to meet the requirements of foreign firms. Therefore, instead of forcing backward linkages via direct policy intervention, policies focusing on strengthening local suppliers' capabilities, creating an investment climate that is conducive to the formation of linkages via market-supporting and market friendly policies and on inducing TNCs to retain existing linkages can, however, contribute to encouraging backward linkage formation and, consequently, technology diffusion.

However, the decline of interventionism as agreed in the context of the World Trade Organisation (WTO) has limited the implementation of these kind of policies that are used to promote linkages (UNCTAD, 2001; Giuliani, 2008).

3.5.2 Import substitution strategy

In many developing countries, the strategy of import substitution has emerged as the dominant strategy of industrialisation. Developing countries have aimed to protect local

industry, particularly infant supply firms, by providing support (in the form of assured demand) during their learning periods (UNCTAD, 2001). According to Battat et al., (1996), in most cases where protectionist measures have been used, they seem to have done little to assist the growth of domestic suppliers: “These forms of protectionism have often shielded domestic suppliers from the competition of the world market, thus encouraging economic inefficiency and a general deterioration of technological and managerial skills” (Battat et al., 1996, p.3). Import substitution strategy did allow a chosen industry to grow faster than the domestic demand for its manufacturers, therefore making the industry appears to be a ‘leading sector’. Thus, this approach was only possible for a limited period of time (Battat et al., 1996).

However, in the case of protected policies, with little pressures to invest in building competitive capabilities, local suppliers would not be efficient; they would saddle the economy with high costs, outdated technologies or redundant skills (UNCTAD 2001, p.169). Therefore, since the linkage promoting process could not be an end in itself and, where these costs outweighed the perceived benefits of linkages creation, policies had to be revised in the interest of economic efficiency as a whole. However, some studies (e.g. Halbach, 1989) have argued that, under certain circumstances, mandatory measures could be useful in giving local firms the opportunity to build supply capabilities (Halbach, 1989).

According to (UNCTAD, 2001), the regulatory policies based on protectionism are not a sound approach to improving backward linkages. While trade liberalisation and abandonment of local content rules may create pressure and in some cases pain to local suppliers by exposing them to intense pressure from foreign firms that already have adopted to market demands in the world economy, but at the same time create new opportunities that push domestic suppliers and enable them to become internationally competitive. The negative result has especially been seen in countries where local suppliers are still constrained by other problems, such as capital scarcity and unstable real exchange rates (Battat et al., 1996).

When countries recognised the failure of protectionist policies, many developing country governments have relaxed the import restrictions and abandoned local content requirements. In addition, some of these countries have taken steps toward economic liberalisation, as in Jordan's case, where one of its aims is to encourage and strengthen backward linkages. Some governments have also adopted programs designed to encourage the productive capabilities of local firms that sell to foreign-owned firms. These changes to government policy in developing countries were given a strong impetus by international institutions (UNCTAD, 2001; Ivarsson and Alvstam, 2005).

However, a number of international and interregional agreements or drafts explicitly prohibited or discouraged government intervention measures previously used to promote linkages (UNCTAD, 2001; Ivarsson and Alvstam, 2005)

3.5.3 Liberalisation

“Technology change is now more rapid and pervasive, affecting most activities in developing countries. It is shrinking economic distance dramatically, exposing enterprises to intense and immediate competition unprecedented in history. Governments are, willingly or otherwise, liberalising economic policies” (Lall, 2002, p. 78). Therefore, many developing countries have implemented liberalisation policies for FDI, hoping that such policies could lead to many benefits and help local firms upgrade their technological capabilities through production linkages, particularly backward linkages. Iman and Nagata (2005 p. 399) argued these benefits depend on many factors: “on the one hand, liberalization offers local firms more backward linkages opportunities and access to the international markets, on the other hand, it brings local firms into more severe competition with global suppliers”.

One key feature of liberalisation has been greater openness to FDI as a means of acquiring technologies, skills and access to international markets, and entering dynamic trade and production systems internal to multinational enterprises (MNEs) (Lall and Narula, 2004). However, liberalisation has not always increased FDI inflows into host developing countries. The reason, according to Lall and Narula (2004, p. 449) is simple:

“the removal of restrictions on FDI does not create the complementary factors that MNEs need; it only allows them to exploit existing capabilities more freely. Thus, FDI response tends to be the most vigorous where local capabilities are strong when liberalisation takes place, and feeblest where they are weak (of course, excluding resource extraction)”. However, the liberalisation, as Lall and Narula (2004, p.449) argue, is not just a necessity but also serves as a sufficient condition for attracting FDI and extracting most development benefits from it.

3.6 Free Trade Agreements

Jordan has conducted several trade agreements with other countries. The following sub-sections deal with the agreements that Jordan conducted with other countries. Table (3.1) summarises these agreements.

3.6.1 Arab Free Trade Agreement (AFTA)

Jordan signed the Arab Free Trade Agreement and its implementation commenced on March 9, 1998. According to this agreement, all Arab products moving among Arab member countries will be afforded the status of national goods in accordance with the principle of gradual liberalisation, which took effect January 1, 1998. “As of January 1st, 2005, the agreement reached full trade liberalisation of goods through the full exemption of customs duties and charges having equivalent effect between all Arab countries members of the GAFTA, except Sudan and Yemen”.

<http://www.mit.gov.jo/Default.aspx?tabid=695>

As a result, this agreement has increased the attractiveness of Jordan to Arab investors and is expected to attract more Arab-based investments in the future (Al-Taher, 2002).

3.6.2 Jordan- EU Association Agreement

Jordan and the EU Member States signed an Association Agreement on November 24th, 1997 with the aim of creating a free trade area between EU and Jordan, as well as establishing a comprehensive framework for political, economic, trade and investment, social, cultural and financial cooperation. The agreement entered into force on May 1st, 2002. The Agreement allows entry of Jordanian industrial exports into EU-member

countries free of customs duties and other charges having equivalent effect from date of entry into force of the Agreement. Also, EU industrial exports are allowed entry into Jordan free of customs duties and charges having equivalent effect over a transitional period of 12 years starting from date of entry into force of the Agreement, except for a list of specific products (<http://www.mit.gov.jo/Default.aspx?tabid=695>).

Table (3.1) Summary of the FTAs that Jordan has conducted with other countries

<i>Trade Agreements</i>	<i>Date of the agreement</i>
Greater Arab Free Trade Area (GAFTA)	1998
Jordan-EU Association Agreement	1997
Jordan-US FTA	2000
Jordan-EFTA Free Trade	2001
Agadir Agreement	2004
Jordan-Singapore Free Trade Agreement	2004
Jordan-Canada FTA	2009
Jordan-Turkey	2009

(<http://www.mit.gov.jo/Default.aspx?tabid=695>)

The accord is likely to encourage more direct European investments into Jordan, as industrial products manufactured in Jordan and exported to the EU will be exempted from customs taxes and fees. Numerous industrial and agricultural products will enjoy privileged access to the EU markets by means of a range of custom tax and quota exemptions (Al-Taher, 2002).

3.6.3 United States-Jordan Free Trade Agreement (FTA)

On October 24th 2000, King Abdullah II and US President Bill Clinton witnessed the signing of an historic agreement between the United States and Jordan. A U.S.-Jordan Free Trade Agreement (FTA) entered into force on December 17, 2001. This agreement was at that time only the fourth free trade agreement the United States has negotiated, after Canada, Mexico and Israel, and the first with an Arab country. This agreement has provided Jordanian products unimpeded access to the world's largest market. The

agreement aims at establishing a free trade area between the two countries within a period of ten years through liberalising trade in goods and services, facilitating the movement of products and natural persons, taking into consideration environment and labour standards. Moreover, the FTA includes provisions governing Intellectual Property Rights, e-commerce, visas, anti-dumping, as well as consultations and dispute settlement mechanisms (Al-Taher, 2002; Kardoosh, 2004).

3.6.4 Jordan-EFTA Free Trade

On June 21, 2001, Jordan and the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland) signed a free trade agreement. The aim of this agreement is to create favourable conditions for the development and diversification of trade and also to promote economic cooperation based on equality, mutual benefit and non-discrimination (<http://www.mit.gov.jo/Default.aspx?tabid=707>)

3.6.5 Agadir Agreement

The Agadir Agreement was signed in Rabat in 2004. This Agreement was entered into force in 2006. It adopts the Pan-EUROMED Rules of Origin that allow for diagonal accumulation of origin amongst its member countries through the possibility of using production input components originating in any of the member countries of Agadir Agreement, EU countries or EFTA countries, to comply with the required rules of origin for the purpose of exporting their products to EU markets exempted from customs duties under their Association Agreements with the EU. The agreement has provided for full liberalisation of trade in industrial and agricultural goods as of its date of entry into force (<http://www.mit.gov.jo/Default.aspx?tabid=733>).

3.6.6 Jordan-Singapore Free Trade Agreement

Jordan and Singapore signed an agreement to establish a free trade area between the two countries in 2004 and this entered into force in 2005. The agreement's aims were: to promote economic relations and developing partnerships between Jordan and Singapore, considering the distinguished experiences that Singapore enjoys in economic development, technology, and improving investment climate. It also aimed to promote

bilateral trade in goods and services between the two countries. According to this agreement, goods of Jordanian origin entering the market of Singapore are exempted from customs duties and charges of equivalent effect from date of entry of force of the Agreement (<http://www.mit.gov.jo/Default.aspx?tabid=710>).

3.6.7 Jordan-Canada FTA

Jordan and Canada signed its agreement in Amman in 2009. However, it has yet to enter into force. Jordan is awaiting the Canadian side to finish the constitutional procedures to ratify the agreement. The Agreement ensures that Jordanian goods access the Canadian market free from customs tariff from the date of entry into force. The Jordan-Canada agreement will create new export opportunities for Jordanian goods in non-traditional markets (<http://www.mit.gov.jo/Default.aspx?tabid=1189>).

3.6.8 Jordan-Turkey FTA

Jordan and Turkey signed an Association Agreement to establish a free trade zone in 2009. The Jordan-Turkey agreement has not entered into force yet, as Jordan is awaiting the Turkish side to finish the constitutional procedures to ratify the agreement to enter into force. According to the agreement, industrial goods of Jordanian origin will enter the Turkish market exempted from customs duties from the date of entry into force (<http://www.mit.gov.jo/Default.aspx?tabid=1342>).

All these agreements may help Jordan's economy to prosper through increasing customs-free exports, attracting foreign investments and facilitating the transfer of technology. The strategy aims to provide Jordanian products and services with preferential access to stable, high-income non-traditional markets. The government has also focused efforts to upgrade the quality of Jordanian products to become more competitive in these markets.

In addition to the above free trade agreements Jordan has made with other countries, Jordan has signed the following agreements:

A. Promotion and Reciprocal Protection of Investment Agreements

In 1997 Jordan and the USA signed a bilateral agreement on the promotion and mutual protection of investment. The agreement emphasises the promotion of greater economic cooperation, and the free flow of investment between both countries. It also grants investors free movement of capital and financial transfers from both sides. Similar bilateral agreements have been concluded also with major European countries, as well as Malaysia, Indonesia, Tunisia, Egypt, Algeria and Yemen (Al-Taher, 2002).

B. World Trade Organization (WTO)

Jordan has acceded to the WTO in April 2000. Accession to the WTO brought new opportunities and challenges to Jordanian businesses. WTO membership assured access to the entire world market for Jordanian manufactured products, but also exposed Jordanian companies to direct competition with international firms. The government has revised its laws, particularly those governing intellectual property rights in order to come into regulatory compliance with WTO standards. Due to the accession of Jordan to the WTO, the Trade-Related Investment Measures (TRIMS) agreement came into force in 2001. Therefore, investment and commercial laws do not contain any trade-restrictive investment measures and have generally been in compliance with TRIMS (Al-Taher, 2002).

C. Investment insurance programs

Investments in Jordan are eligible for Overseas Private Investment Corporation (OPIC) insurance and private financing. Jordan is also a member of the Multilateral Investment Guarantee Agency (MIGA), a World Bank Agency which guarantees investment against non-commercial risks such as civil war, nationalisation, and policy changes. The program covers investments in Jordan irrespective of the investor's nationality, and also covers Jordanian investments abroad (<http://www.state.gov/e/eb/rls/othr/ics/2011/157301.htm>)

3.7 Incentives for FDI

Government's aim by providing incentives to attract FDI to steer investment into favoured industries, activities or regions, or to influence the character of an investment. Incentives "are any measurable economic advantage afforded to specific enterprises or

categories of enterprises by (or at the direction of) a government, in order to encourage them to behave in a certain manner” (UNCTAD, 1998, p.102). They include measures either to increase the rate of return of a particular FDI undertaking, or to reduce its costs or risks. The main types of incentives used are fiscal incentives such as the reduction of standard corporate income tax rate, investment and reinvestment allowances, tax holidays, accelerated depreciation, exemption from import duties; and financial incentives such as government grants, subsidised credits, government equity participation, and government insurance at preferential rates. Other types of incentives frequently used include protection from import competition, closing the market for further entry, and preferential government contracts, preferential treatment on foreign exchange and subsidised dedicated infrastructure and services (UNCTAD, 1998).

In general, most governments direct the incentives to both domestic and foreign investors alike, but in some cases, only the foreign investors can access certain incentives; for example, when special incentives are geared towards large projects or specific foreign investors or where advanced technologies are involved that can only be provided by foreign investors (UNCTAD, 1998). In spite of the intense competitions between governments to provide incentives to foreign investors, there is considerable evidence that incentives are relatively minor factors in the locational decisions of foreign investors relative to other locational advantages such as market size and growth, production costs, skill levels, adequate infrastructure, and economic stability (UNCTAD, 1998).

According to its 2000 investment laws, Jordan is providing incentives for foreign direct investment. Foreign and domestic investment laws grant specific incentives to industry and other sectors and treat foreign and local investors equally, with some exceptions.

Jordan has begun to pursue a more open policy toward FDI. High-technology MNCs are encouraged to transfer technology through the reducing of constraints to their operations and through incentives, such as investment incentives taking the form of income tax and custom-duties exemptions, which are granted to both Jordanian and foreign investors.

These incentives aim to attract foreign firms and consequently to facilitate technology transfer between MNCs and local companies.

3.7.1 Jordan Investment Board (JIB)

As mentioned above, Jordan has undertaken many steps in order to improve its business environment and hence attract foreign investors. The Jordanian government, for example, established the Jordan Investment Board (JIB) in 1995. The JIB has been dedicated to encouraging and facilitating investment in Jordan. With the goal of achieving development and modernisation of the economy, the management and staff of the JIB has placed improvement of the investment environment, and service to the investor at the top of its agenda. The JIB is responsible for marketing Jordan internationally, creating linkages between national and foreign companies through joint ventures, assisting investors at all stages of the investment cycle, and acting as a contact between investors and other government bodies whose services are needed by the investor. However, JIB services can be summarised as follows:

- Identifies investment opportunities
- Facilitates the registration and licensing of investment projects
- Gathers investment data and technical information and shares them with interested investors
- Assists the investor in finding a location for business operations
- Arranges meetings between potential private sector partners and government officials
- Provides ongoing support and problem solving for the project once it is established
- Facilitates arrival and departure of the investor in transit through the Queen Alia International Airport (<http://www.jordaninvestment.com>).

3.7.2 Privatisation programme

Jordan's privatisation programme commenced in 1996. The privatisation programme aims:

1. To reduce the Jordanian government's stake in sectors of the economy previously dominated by state-controlled firms.
2. To liberate the national economy and increase the flow of foreign capital
3. To activate the role and efficiency of private investors in the long-term development plans of the Kingdom.
4. To increasing the efficiency and hence production levels of privatised firms.
5. To create a competitive market where demand and supply can interplay freely, deepening and developing the Jordanian financial market, and improving the quality of services to residents (<http://www.mfa.gov.jo>).

3.7.3 FDI inflows

Foreign direct investment FDI is one of the most important factors of economic growth. FDI contributes to increased productivity of the national economy, reducing unemployment, creating job opportunities, and increases the use of technology.

Most Arab countries have made efforts to improve their investment environment, to attract foreign capital through modern legislation, and to enhance the competitiveness of their national economies. Despite the efforts made by most of Arab countries, they are still suffering from a low volume of FDI inflow compared to other world countries. According to Al-Rawashdeh (2011), this low level of FDI inflow resulted from a lack of effective legislation that should facilitate the process of attracting FDI, impose higher taxes, the lack of political and economic stability in some countries, and the existence of administrative and financial corruption.

Jordan's flow of FDI has grown rapidly ever since the late 1990s. "The value of FDI inflows to Jordan, which has no natural resources, increased very modestly to \$1.954 billion in 2008 from \$1.950 billion in 2007. This slight increase stemmed from the success of the Government policy aimed at attracting FDI despite the current global financial crisis. This policy is based on three dimensions, namely: (a) privatization of the main State-owned companies; (b) facilitating foreign domestic partnerships; and (c) creating free trade zones" (ESCWA, 2009, p. 10).

Table 3.2 shows the volume of FDI for the years (1981-2010). As Table 3.2 shows, FDI grew to 1.66 billion Jordanian dinar (JD) in 2009. FDI was only 46.9 million in 1981. According to the countries of origin, 79% of total FDI inflows to Jordan in 2008 stemmed from four countries, namely: the United Kingdom, which has the largest foreign investment at 29%; the United Arab Emirates, at 26%; Kuwait, at 16%; and Saudi Arabia, at 11% (ESCWA, 2009).

Table 3.2 Volume of FDI for the years (1981-2010)

Year	Value in million (JD)	Year	Value in million (JD)
1981	46.90	1996	79.20
1982	33.00	1997	176.00
1983	13.70	1998	217.60
1984	29.90	1999	109.00
1985	9.60	2000	576.40
1986	10.50	2001	936.00
1987	13.50	2002	528.00
1988	9.60	2003	309.30
1989	1.00	2004	461.60
1990	45.80	2005	108.60
1991	0.20	2006	241.46
1992	47.10	2007	1348.80
1993	40.50	2008	1385.60
1994	21.40	2009	1666.60
1995	37.60	2010	643.30

Source: Al-Rawashdeh et al., (2011, p.148)

3.8 Clustering of economic activity

Another complementary factor of growing significance is the geographical clustering of economic activities (UNCTAD, 2001; Thompson, 2002). When firms are involved in clusters, they are able to achieve synergies; firms will share access to information, supplier and distribution chains, markets and marketing intelligence, and competencies. In addition, this can reduce the costs of transactions, such as the costs of negotiating, monitoring contracts, and the costs associated with the potential for opportunistic behaviour. Furthermore, it has been found that geographical concentrations of firms, suppliers, and buyers provide short feedback loops for ideas and innovations (Enright and Roberts, 2001). Therefore, it is expected that when suppliers and buyers are physically close together, this can facilitate the transfer of technology by personal contact as communication costs increase with distance.

Thompson (2002) argues it might be reasonable to anticipate that FDI from any given industry sector that is itself clustered in a geographically concentrated area ought to transfer technology more extensively than same-sector FDI that is geographically dispersed. In this regard, Thompson conducted a study examining the proposition that FDI within geographical industry clusters should transfer technology more than FDI that is geographically dispersed. His results showed that clustered FDI is significantly better than dispersed FDI at transferring technology in certain respects.

However, Jordan had already created a clustering of activity through the concentration of garment exporters in the Qualified Industrial Zones (QIZs). The presence of foreign manufacturers is likely to enable spillovers to take place to other producers by reducing their input costs and improving their technology and human capital. The presence of garment producers in one location and the associated demand is most likely to lead to the concentration of support services such as freight and customs, machinery supplies, labour markets, vocational training, health care, and so on, thereby reducing their costs and improving their quality. The availability of these inputs may attract other multinationals to locate in the QIZs.

Most of the foreign firms are concentrated in a few major areas, in qualified industrial zones, industrial state and free zones, and some out of these areas. These areas are very developed in terms of infrastructure and other industrial facilities. The following subsections provide brief details about qualified industrial zones, free zones, and industrial states.

3.8.1 Qualified Industrial Zones (QIZs)

Jordan was granted the unique opportunity to establish QIZs by US government, zones that provide duty and quota free access to the U.S. market for products manufactured in QIZs. QIZs are areas specially designed for manufacturing companies which produce or assemble products mainly for exports.

There are currently eleven QIZs located throughout Jordan, three of which are publicly owned; the remainder are privately owned. Most of the firms located in qualified industrial zones are foreign fully-owned. However (QIZ) are divided into three development areas: Zones A, B, and C. Investments in Zone C, the least developed areas of Jordan, receive the highest level of exemptions.

Approved goods produced in a (QIZ) can be imported to the United States duty-free if the products contain 8% of the inputs from Israel and QIZ factories must add at least 35 percent to the value of the products. This 35 percent minimum content can include value added in Israel, Jordan, or the United States. This also enables industries to enjoy the duty-free import of raw materials, component parts, machinery and other equipment required directly in the manufacturing process.

This opportunity makes the investment in a QIZ attractive to industries whose products are assessed with high tariffs when they are imported to the U.S. As of December 2005, the bulk of QIZ exporters have been concentrating on garment exports. Since 1999, the QIZs have attracted US \$450 million in capital investments, generated over US \$3 billion in exports to the U.S., and created over 40,000 new jobs.

(<http://www.au.af.mil/au/awc/awcgate/crs/rs22002.pdf>)

3.8.2 Industrial Estates (IEs)

Industrial estate is an area which has been specially planned for manufacturing companies. Currently there are four industrial estates in Jordan. The main industrial estate is located in Sahab 30 km from Amman. The industrial states have high concentrations of the four industrial sectors and also very popular with foreign firms. Sahab estate, for example, contains over 160 foreign firms (24 Non-Arab and 139 Arab) with a total invested capital of JD 1014 million. The main investment activities focus on engineering (metallic and electric), food, plastic, chemical, and cotton and weaving industry sectors (<http://www.amchammena.org/Jordan>).

Table 3.3 shows the list of qualified industrial zones, free zones, and industrial estates operating currently in Jordan.

Table 3.3 (list of the qualified industrial zones, free zones, and industrial states)

<i>Qualified Industrial Zones</i>	<i>Industrial States</i>	<i>Free Zones</i>
<u>Public QIZs</u>	1. Abdallah II Bin AL-Hussein	1. Sahab free zone
Al1. Hassan industrial park	Industrial Estate/Sahab	2. Zarqa free zone
Al-2. Hussein Bin Abdullah II industrial state	2. Al Hassan Industrial Estate /Irbid	3. Al-Karak free zone
Aqaba QIZ	3. Al Hussein Bin Abdallah II Industrial Estate / Karak	4. Al-Karama free zone
<u>Private QIZs</u>	4. Aqaba International Industrial Estate /Aqaba	
Al- Dulayl Industrial Park		
Al- Tajamouat Industrial Park		
Gateway industrial Park		
Cyber City Park		
Hashemite University		
Al-Qatal Industrial Park		
Al-Mushata Industrial Complex		

Source (<http://www.jordaninvestment.com>)

3.8.3 Free trade zones

There are five operating free zones in Jordan: Zarqa Free Zone, Sahab Free Zone, Al-Karak Free Zone, and Al-Karama Free Zone, and Queen Alia International Airport Free Zone. Zarqa Free Zone is Jordan's major free zone area. Both are operated by the Jordanian Free Zones Corporation, an autonomous government agency. These zone areas were created to attract export-intensive industries (<http://www.jordaninvestment.com>).

3.9 Sources of technology to developing countries

Economic growth in industrialised economies is often generated by technological change and closely integrated production systems across firms and regions (Lall, 1998). However, owing to the lack of technology in developing countries, and due to limited capacity for many of these developing countries to generate new technology, it is, therefore, crucial for these countries to import technology from abroad and to combine it with domestic human resources for long-term economic growth (Ivarsson and Alvstam, 2004). For this reason, developing countries are greatly dependent on advanced industrialised countries to import technology from abroad. Despite serious attempts by

some developing nations to develop their technology, there is still a big gap between advanced countries and developing countries. There are historical causes for this large dependence. The most significant is that advanced countries have already experienced and overcome industrial isolation, but in developing countries, this lack of experience provides a serious constraint to technological development.

According to Byun and Wang (1995), the economic growth of every nation is linked to the successful international transfer of technology, because the essence of modern economic growth depends on an increase in the stock of useful knowledge and the extension of its application. The origins of these technologies and knowledge have never been confined to the borders of any single country. Therefore, the economic growth of all countries depends to some degree on the successful application of transferred knowledge and technology.

However, technology can be transferred to developing countries through a variety of mechanisms such as trade, because technology is embodied in imported inputs and goods, technology licensing agreements, joint ventures, technical assistance, management contracts, and turnkey projects etc, or through foreign direct investment. One of the important sources of technology to developing host countries is related to the externalities resulting from the linkages that local suppliers can create with the foreign subsidiaries of MNCs. These linkages can assist domestic firms to obtain new technology and access to new management practices (Lall and Mortimore, 2000; UNCTAD, 2001, Ivarsson and Alvstam, 2004).

However, these different channels of technology transfer should be seen as a complement to each other rather than as substitutes. The type of technology seems to affect the mode of transfer. Therefore, certain advanced technologies may not be available through means other than foreign direct investment. Thus, keeping the doors open to the acquisition of technological information through several different channels will eventually lead to more technology transfer and higher productivity growth.

The impetus behind this research derived from two points; first, the increasing importance of technology and the important role that technology plays in economic progress and growth; and second, the shortages of scientific knowledge in the developing countries. While economic growth in industrialised countries is widely generated by technological change and to great extent by integrated production systems across firms and regions (Lall, 2002), it is crucial for developing countries to import technology from abroad as long as they have limited capacity to generate new technology by themselves.

3.10 Summary

This chapter presents the background to the Jordanian business environment that may have an effect on the formation of backward linkages, and as a result the transfer of technology to the host country. The chapter also provided background about Jordan's economy. In addition, this chapter discussed the determinants of FDI inflows that have been found in previous literature. As the host countries vary in terms of their economic development, their characteristics, and their policy toward FDI, this chapter presented these characteristics and policies which might have an effect on the impact of MNCs on a host country. The chapter also dealt with the Free Trade Agreements that may play important roles for the attractiveness of Jordan for FDI inflows and the incentives provided to foreign investors. Statistics about FDI inflows to Jordan have been provided, and the clustering of foreign firms that may facilitate the transfer of technology discussed as well. The sources of technology to developing countries are also discussed in this chapter.

Chapter Four

Research theoretical model and hypotheses

4.1 Introduction

Chapter Three dealt with the host country's business environment, which may increase or decrease the attractiveness of the host country, the formation of backward linkages, and accelerate technology diffusion over firms in the host economy. The focus was also directed towards Jordan's investment environment.

The literature reviewed and presented in the previous chapters discussed some of the available theoretical and empirical insight into the subject. This review provides some support for the contingent relationships between several factors and the transfer of technology through backward linkages.

Vertical spillovers refer to productivity between foreign firms and their local suppliers or customers. In this study, we focus on the backward linkage channel. As discussed in Chapter Three, multinationals often provide technical assistance to their supplier in order to raise the quality of their products or facilitate innovation. They help suppliers with technical assistance, management training, production organisation, purchasing raw materials and intermediate inputs, and even finding additional customers. However, existence of linkages does not necessarily lead to spillovers or the transfer of technology.

The relationships between the dependant variable (transfer of technology) and independent variables (the size of the firm, the firm's ownership structure, foreign subsidiary autonomy, market-orientation, type of industry, origin of the multinational firm, experience of foreign firm, and geographic proximity) are still unclear due to limited research in this area and also due to the mixed findings of previous studies as Chapter Four showed. The aim of this chapter is to provide explanations and clarifications for building the research theoretical model and developing the hypotheses. This is primarily based on key findings and recommendations from the literature review in relation to backward linkages and transfer of technology.

This chapter is structured as follow: Section 4.2 discusses the building of the research theoretical model based on the literature review. Section 4.3 represents the need for study and the research questions. Section 4.4 introduces the operational definition for the research variables in the model. The suggested relations between research variables and the formulations of the hypotheses are given in Section 4.5. Finally, Section 4.6 provides a summary of the chapter.

4.2 Building the research theoretical model

This study attempts to analyse the impact of foreign firms on local industries that supply them with parts and components of the manufacturing process through backward linkages in the context of Jordan. Therefore, two areas of research are important for this study. The first area is the prior literature on transfer of technology by MNCs to host countries provides us with the potential channels for this transfer. The second area is the prior research on backward linkages which suggest several variables that may affect the formation of backward linkages and consequently the transfer of technology. These studies provided the motivation for developing the research theoretical model and the research hypotheses for this study.

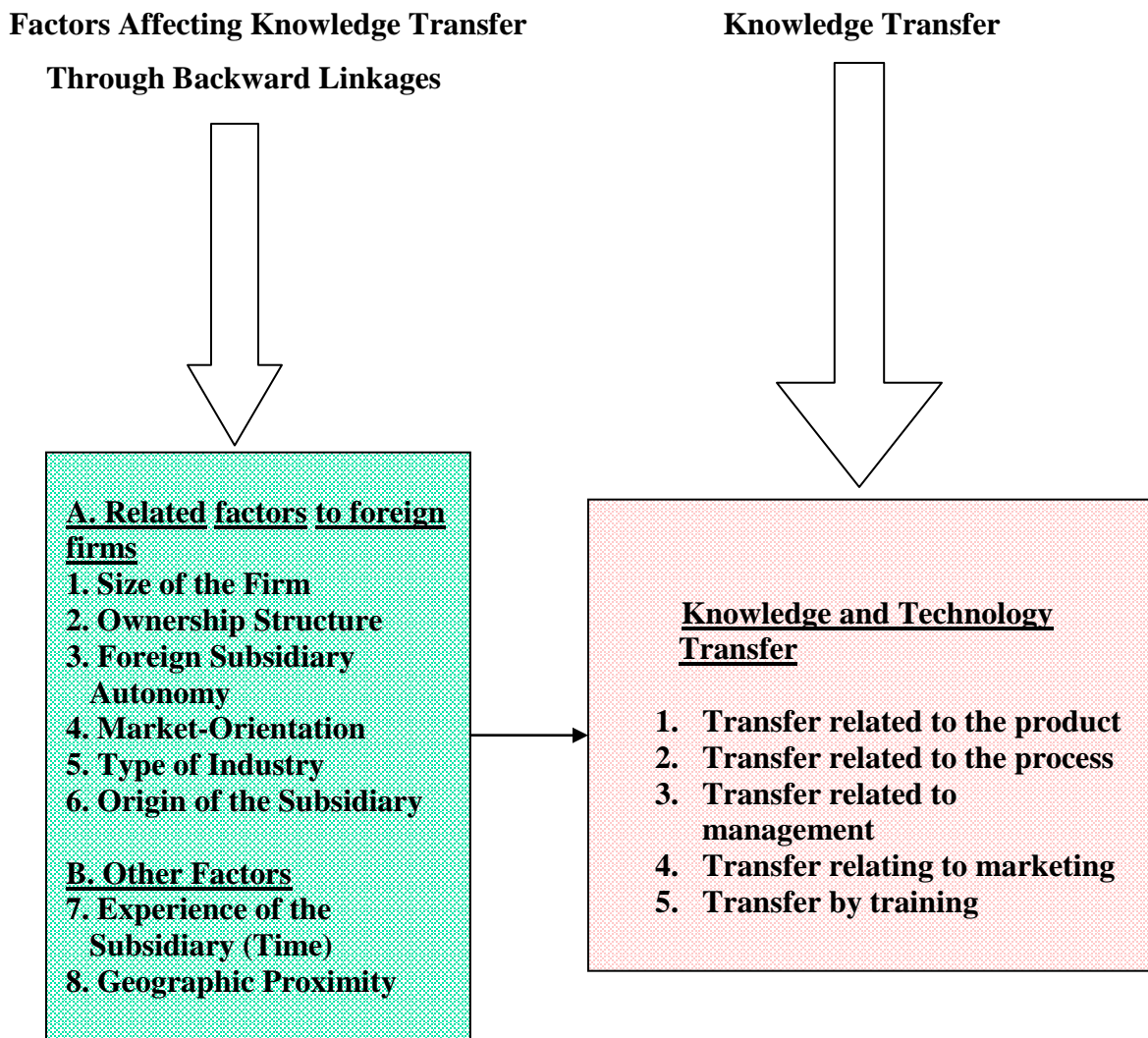
Numerous empirical studies have been conducted on the impact of multinationals on the host economy. Some of these studies focused on the level of local purchases by multinationals (e.g. Driffield and Noor, 1999; Belderbos et al., 2001; UNCTAD, 2001), while others concentrated on the issue of knowledge and technology transfer through backward linkages (e.g. Halbach, 1989; Crone and Roper, 2001; Giroud, 2003, 2007; Ivarsson and Alvstam, 2004, 2005).

This research focuses on vertical transfer; in particular, the transfer from foreign firms to their local suppliers, and how different factors may determine the magnitude of this type of transfer. However, it is hard to study and explore all the possible determinants of backward linkages and transfer of knowledge in depth. For example, it is possible to

consider the type of product if the study deals with one sector, but impossible to take this factor into consideration if the study deals with several industrial sectors.

Some authors, however, considered the issue of technology transfer from the side of the MNC (e.g. Crone and Roper, 2001; Giroud, 2003), while others considered the issue from the side of the recipient (e.g. Ivarsson and Alvstam, 2004). This research follows Crone and Roper (2001) and Giroud (2000) by considering the issue from the side of MNCs.

Figure 4.1 the research theoretical model



The theoretical model of this research includes two groups of variables that may or may not affect the transfer of technology through backward linkages. Some of these dependent

variables are related to foreign subsidiaries and some are categorised as other factors. The dependent variable represents the transfer of technology. In order to present the relationships between the aforementioned parts, the decision was made to build the research theoretical model as illustrated in Figure 4.1.

4.2.1 Justifications for building the research theoretical model

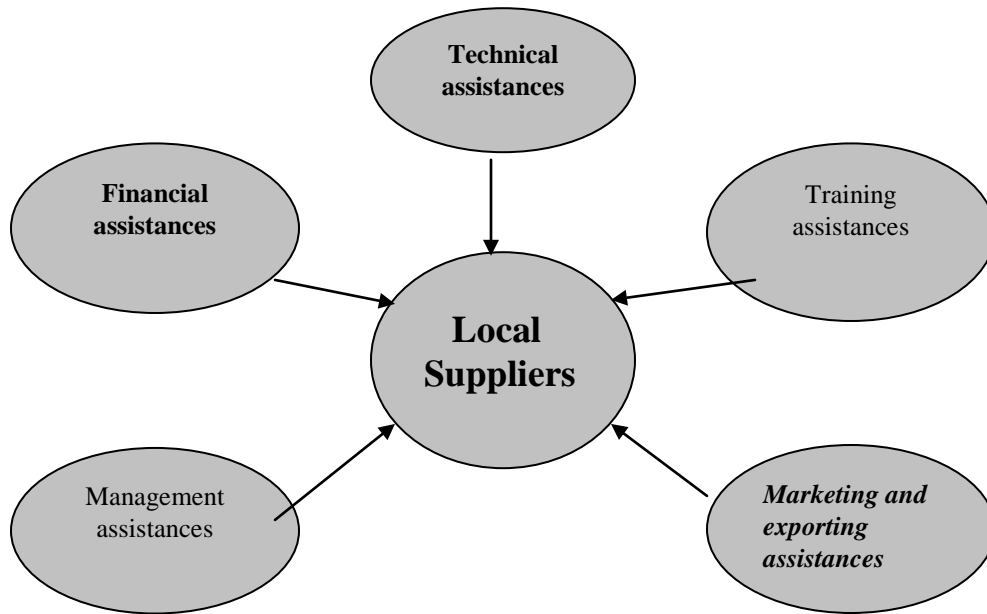
Figure 4.1 explains the research theoretical model, which is the conceptual framework of this research. The figure shows the relationship between the two parts of the model. The first part is concerned with eight dependent variables: the size of the firm, the firm's ownership structure, foreign subsidiary autonomy, market-orientation, type of industry, origin of the multinational firm, experience of the foreign firm, and geographic proximity. The second part is concerned with the extent of transfer of technology from foreign firms to their suppliers and subcontractors, which include transfer related to the product, transfer related to the process, transfer related to management, transfer relating to marketing, and transfer by training. In the light of previous research (e.g. Giroud, 2003 and Halbach, 1989), the assistance provided to local suppliers were divided into five categories (see Figure 4.2). Section E of the questionnaire was designed to explore the types of assistance provided to local suppliers from the purchasing managers of foreign firms' point of view.

The arguments and justifications that explain the rationale for constructing the research model are primarily based on previous theoretical and empirical research in the transfer of technology through backward linkages. In addition, the justifications for conducting this research have been derived from gaps that emerged from the literature review. Furthermore, empirical research dealt mainly with intra-industry spillovers from FDI with restrictive treatment of inter-industry effects (Kugler, 2006, p.444).

Most of the local linkages studies have focused specifically on electronics industries or specific sub-sectors. For example, Driffield and Noor (2000) and Giroud (2000) focused on the electronics and electrical industry in Malaysia; Turok (1997) focused on the electronics industry in Scotland, and Angel (1994) on the semiconductor industry in the

US. Therefore, these studies did not allow the generalisation of the result to the whole industrial sector. However, the following justifications are identified in the earlier literature.

Figure 4.2 Types of assistances provided to suppliers



“Owing to difficulties in collecting relevant data, there are few empirical studies of the extent to which TNCs provide their suppliers in developing host countries with technology assistance. There are even fewer empirical studies of the significance of this assistance for the technological capability of these suppliers” (Ivarsson and Alvstam, 2004, p.242).

The evidence on vertical technological spillovers in developing countries is very mixed (Sinani and Meyer (2004); Jindra (2006); Crespo and Fontoura (2007); Jindra et al., (2009). In this context, Sinani and Meyer (2004, p.448) remarked, “Empirical research analyzing FDI spillovers via technology transfer to domestic firms in transition, developing, and developed economies provide mixed results. Some studies find that a foreign presence has a positive impact on the productivity of domestic firms, while others find no evidence or a negative effect”. In addition, Crespo and Fontoura (2007) remarked

that the evaluation of aggregate FDI spillovers to domestic firms has yielded mixed results. FDI spillovers depend on many factors. “The absorptive capacities of domestic firms and regions are preconditions for incorporating the benefits of these FDI externalities. Regarding the remaining factors, the results show contrary effects or, in some cases, are still insufficient to draw reliable conclusions” (Crespo and Fontoura, 2007, p. 410).

“Given the importance of technology linkages between TNCs and their suppliers for economic development in the developing countries, the empirical literature on linkages and spillover effects is surprisingly restricted” (Ivarsson and Alvstam, 2005, p. 87). According to Blomstrom and Kokko (1998), one reason may be that empirical studies on the effects of linkages from inward FDI are difficult to conduct because of the need for detailed quantitative and qualitative micro-data. Therefore, only a few statistical analyses that have used data sets are available. Instead, most studies of technology linkages have been case studies of specific firms and industries in selected host developing countries (UNCTAD, 2001). Furthermore, Smarzynska (2002, p. 2) remarked, “Despite the keen interest of policy makers in the subject, little is known about the factors driving vertical spillovers”.

Previous studies mostly focused on empirically investigating the effects of FDI in developing countries on intra-industry spillovers. In this regard, Kugler (2006.p. 444) remarked that previous empirical research dealt mainly with intra-industry spillovers from FDI with restrictive treatment of inter-industry effects until recently. Therefore, one of the aims of this study is to contribute to the literature by investigating the relationship between the dependent variable (transfer of technology) and independent variables (the size of the firm, the firm’s ownership structure, foreign subsidiary autonomy, market-orientation, type of industry, origin of the multinational firm, experience of foreign firm, and geographic proximity) on transfer of technology in developing economies, thereby leading to a better understanding of when and how foreign firms contribute to the local economy and local firms’ development.

Based on the above argument and debate, more research is therefore needed to understand the extent to which backward linkages, generated by foreign firms, promote the expected transfer of knowledge. It aims to contribute to this issue by exploring the pattern of knowledge transfer, the factors that affect this transfer, and the obstacles of this transfer in the contest of Jordan. It also explores whether there is a differences in the pattern of knowledge transfer among different industrial sectors.

4.3 The need for study

This research focuses on the technological impact of FDI in Jordan. As shown in chapter 3, there are many potential channels for the transfer of technology from MNCs to the local firms. This research focuses on the transfer of technology from MNCs to their local suppliers and subcontractors through backward linkages. The differences between the findings of the previous empirical studies that have been conducted on the effect of backward linkages on transfer of technology highlight the need for more research on this topic.

Previous empirical studies that have studied this phenomenon have almost considered various emerging economy host countries, for example: Singapore (Brown, 1998; Wong, 1992), Kazakhstan (Griffith and O'Brien, 2001), Lithuania (Smarzynska, 2002), Malaysia (Giroud, 2003), India (Ivarsson and Alvstam, 2004), China (Duanmu and Fai, 2007), Eastern European economies (Jindra et. al, 2009) and Slovenia (Maja et el., 2009).

Jordan is among the Arab countries that need FDI. One of the most important motivations for the Jordanian government to attract FDI inflow is to improve the Jordan's overall level of technology. The relationship between FDI and technological spillovers in Jordan is not clearly defined due to the difficulties in obtaining data and the complexities of defining the relationships. Thus, work based on quantitative and qualitative analysis in Jordan is scarce, which lends itself to the importance of studying the relationship between FDI and technology spillovers in Jordan.

Previous studies present mixed evidence on the role of foreign investments in generating technology transfer to local firms; this mixed empirical evidence suggests that spillover

benefits cannot be assumed. Rather, research needs to identify the factors that affect this transfer.

Most studies are descriptive in nature, but more systematic empirical studies are needed to determine the factors that affect the technological transfer to local supplier. An understanding of these factors is important for maximising the benefits of FDI to the Jordanian economy. In addition, the lessons derived from this study will also provide useful indicators on the direction and likely success of FDI policies in other developing countries.

One of the important strengths of our research is the richness of our data due to using both quantitative and qualitative approaches. Ninety three questionnaires were analysed. In addition, thirteen foreign firms have been interviewed, giving us broader and more detailed insights than those studies that only used qualitative or quantitative data and used very small number cases, such as Wong (1992), Brown (1998), and Ivarsson and Alvstam (2004).

In this study, we examined MNC subsidiaries operating in Jordan. We selected this setting for three specific reasons. First, there is lack of research conducted on this topic in Arab countries, and Jordan was selected as an opportunity to extend our application of the phenomena under study to Arab countries. Second, Jordan is marked by a diversity of foreign MNCs establishing subsidiaries, thus providing diversity for industrial sectors. Third, in spite of the complex socioeconomic problems (e.g., high inflation and debt, high unemployment), Jordan's economy provides major business opportunities.

We believe that our study can contribute to a deeper understanding of technology transfer from foreign firms to their local suppliers in five ways. Firstly, it enables us to draw some general conclusions about technology transfer, since it includes almost all the industrial sectors in Jordan. Secondly, most of the studies on technology linkages have been case studies of specific firms and industries in selected host developing countries (UNCTAD, 2001). Therefore, the number of foreign firms included in our study is large enough to

enable some advanced statistical analysis as a complement to earlier case studies. The third contribution is that our study also includes the role of the type of industry between foreign firms and their local suppliers as an important determinant of factor technology transfer. Thus, this allows us to make comparisons between the various industrial sectors, which to our knowledge has not been tested before. The fourth contribution is that our study conducted both quantitative and qualitative analysis, where most previous studies have been subjected to only partial analysis. Fifth, this research contributes to our understanding in terms of the role of the ownership structure of FDI projects for the host country and its effect on technology transfer from foreign firms to their local suppliers, which to our knowledge has been rarely tested before. Thus, we examine whether wholly owned foreign affiliates and investments with joint domestic and foreign ownership are associated with a different magnitude of spillovers within the industry of operation and to upstream sectors supplying intermediate inputs. In addition, our study can contribute to a deeper understanding by taking other factors into consideration, since previous studies' findings show mixed results regarding the effect of transfer of technology, as will be evidenced later in this chapter.

4.4 Operational definition of the research variables

Factors affecting backward linkages creation process are numerous. This research, however, identified and considered eight major factors to study. These factors are important to the study as they may affect the creation of backward linkages and subsequently the transfer of technology to local firms. Identification of these factors and factors that have a major impact towards the transferring of technology is important, because knowing which of them have the greatest impact is not possible until after an analysis is carried out.

4.4.1 Transfer of technology- Dependent variable

As mentioned in Chapter One, one of the aims of this research is to assess the existence of technology transfer from MNCs to their local suppliers in Jordan. Technology is embodied in every value activity of a firm (Porter, 1980). By improving the efficiency of

these activities, technology helps to decrease production costs and to enhance manufacturing productivity (Gisselquist and Grether, 2000).

As argued by Javorcik (2007), the knowledge content of the spillover effect is inherently an abstract concept and thus not directly measurable. Therefore, in the present study we analyse the extent to which foreign firms transfer a technology to their local suppliers by different transfer activities. According to the previous literature (e.g. Giroud, 2007; Crone and Roper, 2001), five transfer activities were identified: first, by assistances related to the product itself; second, by assistances related to the process of manufacture; third, by the assistances related to management and marketing; fourth, by the assistances related to financial and accounting issues; lastly, the training provided by local suppliers. However, procurement by MNCs of a large share of their material inputs from suppliers in Jordan and then creation of backwards linkages with local firms does not necessarily mean that transfer of technology takes place.

In this research, the researcher followed Giroud (2003, 2007) by measuring the transfer of technology by investigating the incidence of various technology transfer activities.

Thus, this study depends on the responses provided by the respondents to parts of section E of the questionnaire. The extent of technology transfer is calculated through the frequency of the responses of all types of assistances provided to local suppliers (i.e. Technical assistances, managerial assistances, assistance by training, and marketing assistances). The greater frequency of this variable provides an indication that transfer of technology takes place to a greater extent. Hence, managers were asked to indicate whether or not their firms were involved in each of 22 selected 'technology transfer activities', and they asked to indicate the extent to which their firms were involved in technology transfer activities to their local suppliers, using five-point rating scale (ranging from 'never' to 'always'). Technology transfer activities are related to the production, managerial, and training issues and have been measured in terms of event frequency. Transfer activities comprise product and process technology related to the manufacturing of material inputs for the MNCs (12 items), technology related to the

management and marketing (7 items), and knowledge transferred through training (3 items).

4.4.2 Independent variables

Some of these factors are related to the foreign firm and include: size of the firm; ownership structure; foreign subsidiary autonomy; market-orientation; type of industry; and country of origin of the multinational firm. The other factors that are taken into account in this study include the experience of foreign subsidiary in the host country and the geographic proximity between the subsidiary and the majority of its suppliers.

4.4.2.1 Size of the firm

Following the argument developed in Chapter 4, size of the firm has been widely used as a contingent variable in backward linkages studies. The previous studies (e.g. Alitken and Harrison 1999) have measured firm size using the following dimensions: number of employees, sales turnover and total assets. This research will measure company size by number of employees.

However, as Altenburg (2000) remarked, that there is a problem of defining small, medium, and large firm and no generally accepted definition exists. Categories such as small, medium, and large only make sense relative to a given size structure. To make a comparison between the firms in terms of the transfer of technology and based on their size, the firms are divided into two groups. The first group is the firms that have more than 214¹employees, threshold value of the size is the mean of the firms' number of employees), and the second group is the firms that number more than 214 employees.

¹ The researcher used the mean of the number of employees as threshold value to divide the firms into two groups.

4.4.2.2 Ownership Structure

With respect to the effect of ownership structure, we test the hypothesis that transfer of technology associated with partially-owned foreign projects lead to greater transfer than transfer by wholly-owned foreign firms. We also consider the percent of partially-owned foreign firms. If the percent of local ownership is 50 percent or more it ranks as 1, otherwise, it ranks as 0.

4.4.2.3 Foreign subsidiary autonomy

The level of autonomy is measured by the degree of dependence that is granted by a parent firm to the subsidiary in terms of where to source the inputs of the manufacturing. The respondents were asked to indicate to what extent the firm is independent in its decision of where to source the inputs. According to their response, the firms are divided into two groups. The first group includes the firms that indicate that they are totally or mostly dependent, while the second group includes the firms that indicate that they are totally or mostly independent.

4.4.2.4 Market-orientation

The researcher followed Smarzynska (2002) who considered a foreign firm that exports 50 per cent or more of its output as export-oriented firm. On the other hand, firms are considered as local market-oriented if the sale of its output to foreign markets is less than 50 per cent.

4.4.2.5 Industry characteristics

The firms included in the survey were categorised into four groups based on the industrial sector in which they operate. The main advantage of categorising the firms by industrial sectors is that it helps to make comparisons between them in terms of the creation of backward linkages and transfer of technology.

4.4.2.6 Country of origin of the multinational firm

The firms in the survey were divided into two main categories based on the country of origin of the firms; namely, Arabic original and non Arab origin, mainly from America,

Europe, and Asian. This division allows for comparison between the two groups in terms of the extent of technology transfer.

4.4.2.7 Experience of foreign subsidiary

This can be measured by the time spent in the host country (the time of the survey minus the time of establishment of the foreign subsidiary measured by year).

4.4.2.8 Geographic proximity

The firms were divided into three groups. The first group includes the firms where the majority of their local suppliers are located at a distance of less than 50 km. The second group includes the firms whose majority of local suppliers is located at a distance between 50 and 100 km. and the third group includes the firms where the majority of their local suppliers are located at a distance of more than 100 km.

4.5 Research variables and hypotheses formulation

This section describes the main hypotheses of the study. The contingency theory framework has been used in this research to achieve some of the research objectives. Thus, the eight contingent variables specified in Figure 4.1 are addressed to examine the relationship between contingent variables and the extent of technology transfer through backward linkages with local suppliers.

4.5.1 Size of the firm

The literature postulates that firm-specific advantages of big firms are different from those of small and medium enterprises. Big firms are often recognised as technologically superior and to have economies of scale, mainly originated by developed countries, while small and medium firms are from both developed and developing countries. FDI from small and medium firms is small in bulk but large in terms of affiliates (Buckley, 1998).

Giroud (2003) found that large subsidiaries source less locally than small subsidiaries, but they are also found to create more linkages with local suppliers. Thus, large subsidiaries might be less beneficial to the host economy in terms of purchasing less, but

on the other hand may bring benefits in terms of developing local suppliers' capabilities by providing them with different types of assistance (Giroud, 2003; UNCTAD, 2001). The size of the subsidiary operating in the host country may then affect the formation of backward linkages, and subsequently transfer of technology and knowledge to host country economy. Tavares and Young (2002) found no significant relationship between the size of the subsidiary and the inputs imported from abroad, while Driffield and Noor (1999) found that once the variables relating to transaction costs are included, firm size becomes irrelevant. However, there is still a lack of consensus about the impact of the size of the firm on supply linkages and then the transfer of technology. Pous (2005) found that the size of the firm is a relevant variable to explain the formation of backward linkages. Pous suggests that large MNCs source inputs mainly from the company's internal global network, whereas small and medium-sized subsidiaries are more likely to generate backward linkages at the domestic level. Giuliani (2008) also explored the effect of the size factor in the analysis of the patterns of local knowledge transfer in technology-intensive Costa Rican firms, but with no significant results. Therefore, due to the concluding, mixed results from the previous studies that take this factor into consideration, we include this factor in our research. Thus, it can be hypothesised that:

H1: Larger subsidiaries are associated with greater backward linkages to local firms and transfer more technology.

4.5.2 Ownership Structure

The ownership structure of FDI projects is likely to have an effect on vertical spillovers. As argued by Javorcik and Spatareanu (2008), affiliates with joint domestic and foreign ownership may face lower costs of finding local suppliers of intermediates and thus more likely to engage in local sourcing than wholly-owned foreign subsidiaries. Finding local firms able to meet the requirements of the foreign firms take time and effort. This in turn may lead to greater technology transfer to local producers in the supplying sectors.

Greater technological sophistication of wholly-owned foreign subsidiaries may in turn impede knowledge diffusion to local firms operating in the same sector, which may lack sufficient absorptive capacity. Furthermore, wholly-owned, foreign affiliates with greater

technological sophistication may require more complex inputs that could be more difficult for local firms to provide. Therefore, it is most likely that fully-owned foreign affiliates rely more on imported inputs, while firms with a local participation will tend to source more locally and hence lead to greater transfer of technology. In contrast, projects with joint domestic and foreign ownership may result in greater knowledge dissipation due to their lower technological sophistication and involvement of the local partner (Smarzynska, 2002; Javorcik and Spatareanu, 2008).

Empirically, Driffield and Noor (1999) found no relationship between joint-ventures (partly foreign-owned) and local supply linkages, while Tavares and Young (2002) found no relationship between the company being a greenfield venture (wholly-owned) and the input's import propensity. Javorcik and Spatareanu (2008) found that vertical spillovers are associated with projects with shared domestic and foreign ownership but not with wholly owned foreign subsidiaries. Given these arguments, we anticipate more frequent vertical spillovers to be associated with projects with joint ownership than with wholly owned foreign subsidiaries. Therefore, it can be hypothesised that:

H2. Majority-foreign owned subsidiaries are associated with fewer backward linkages with local firms and transfer less technology compared with minority-owned subsidiaries.

4.5.3 Foreign subsidiary autonomy

The purchasing strategy for the foreign subsidiary is a key factor for the development of local linkages within host economies (Giroud and Mirza, 2006; UNCTAD, 2001); it depends on the relationship of the subsidiary with its parent firm, and the subsequent level of dependence. The general parent firm policy toward the sourcing of inputs will determine the degree of sourcing autonomy granted to individual subsidiaries. Thus, the level of autonomy granted by a parent firm to the subsidiary affects its linkages creation in the host country. The greater the freedom of the subsidiary, the more likely it is to identify and create linkages with local suppliers (UNCTAD, 2001). This factor related to the concept of vertical integration; in the case of strong integration at a global scale, foreign subsidiaries are less likely to develop local supply linkages than firms with lower

corporate integration, which has more choices in its sourcing (Dicken, 2003; Tavares and Young, 2002). In spite of this, MNCs operating in developing countries prefer local procurement when possible, as long as geographical proximity can lower transaction costs, enable closer monitoring, and give more flexibility in changing specifications and developing new inputs (UNCTAD, 1999; Iman and Nagata, 2005). However, the decision to source locally in a host country depends also on the cost, quality, reliability and flexibility of local suppliers compared to suppliers abroad. The relations of the subsidiary with its existent suppliers in its home country or elsewhere in the TNC network may inhibit or discourage the development of local linkages in the host country, especially if the local suppliers are perceived to be less reliable or of lower quality (Dicken, 2003). The literature shows limited evidence on how subsidiaries' strategies affect linkage creation in developing countries (Meyer, 2004, Jindra et al., 2009). However, it is expected that levels of subsidiary autonomy increase the potential for technology diffusion to local suppliers. Thus, it can be hypothesised:

H3. More autonomous subsidiaries are associated with greater backward linkages with local firms, and transfer more technology.

4.5.4 Market-orientation

The foreign subsidiary's production could be oriented to serve the local market or be an export platform activity. The motivation for undertaking FDI is likely to affect the extent of local sourcing by an affiliate. It has been suggested that local market-oriented foreign firms tend to purchase more locally than do export-oriented ones (UNCTAD 2000; Altenburg 2000; Belderbos et al., 2001; Smarzynska, 2002; Dicken, 2003). This could be due to the fact that quality and technical requirements associated with products targeted for the domestic market may be lower, and local suppliers may find it easier to serve multinationals focused on the local market. On the other hand, export-oriented foreign firms serving global markets may impose more quality requirements, making it difficult for local suppliers to meet (Altenburg 2000; Belderbos et al. 2001; Smarzynska, 2002; Dicken, 2003). Based on these arguments, it is then likely to find more frequent transfer from firms oriented to serve the local market than the exported-oriented ones. Thus, it can be hypothesised that:

H4. Subsidiaries that primarily sell their product on the local market are more likely to show high transfers of technology than subsidiaries that primarily supply export markets.

4.5.5 Industry characteristics

When a firm purchases its input for manufacturing operations, the scope for linkage with local supplier differs according to the sector that firm operates in. For example, firms in the primary sector have less scope for linkages with local supplier than firms in the manufacturing sectors (UNCTAD, 2001). Even within the manufacturing sectors, it is likely to find more backward linkages in single sector than other, because this depends on the parts and components required for certain industry and also depend on the availability and quality of those parts and components in the host country. Thus, the scope for local purchasing varies from sector to another. For example, research revealed that subsidiaries in the textiles, clothing and footwear industry have a strong propensity to import input (Tavares and Young, 2002). Therefore, it is likely to find few local supply linkages in this sector, and subsequently, less transfer of technology and knowledge. While in the electronics and electrical industry, the level of local purchasing may be limited in developing countries (Giroud, 2003).

A review of the literature reveals several shortcomings that have limited our understanding of how the industrial sector firm operates in influencing its strategies, such as creation of backward linkages with local suppliers and ultimately transfers of technology. Most of the prior research on transfer of technology from foreign firms to their local suppliers focuses on a single sector, such as electronic and electric, or automobile industry. For example, Giroud (2003) focused on the electronic and electric sector; Ivarsson and Alvstam (2004) focused on the automobile industry, and Giuliani (2008), who has included in his study of the patterns of local knowledge transfer two industries, electronics and the medical devices subsidiaries, but did not analyse differences between these two groups in terms of the extent of technology transfer. These studies overlook the important influence of the type of industrial sector that a firm operates in. However, in order to advance our understanding of the factors influencing

technology transfer, the sector that a firm operates in should be taken into account. Therefore, it can be hypothesised that:

H5. The extent of technology transfer differs according to the industry in which the subsidiary is operating.

4.5.6 Country of origin of the multinational firm

There is a lack of strong evidence about the effect of the origin of the multinational firm, to explaining supply linkages and transfer of technology. Japanese firms, for example, are often found to be less inclined to establish vertical linkages but to rely on imports of components and materials from Japan (Giroud, 2003; Capannelli, 1997). For instance, Giroud (2003, p.292) found that Japanese subsidiaries purchase few materials and intermediates locally, and when they do so, they primarily use other Japanese suppliers located in Malaysia. European and North American affiliates rely more on locally direct purchase, but for low-technology-intensive only. This is supported by Tavares and Young (2002), who indicated that Japanese-owned subsidiaries had a higher propensity to import. In spite of that, (UNCTAD, 2001) indicate that Japanese-owned subsidiaries increased their local procurement in all host countries during the 1990s. Also, Driffield and Noor (1999) found that United States firms are more embedded in Malaysia, suggesting that linkages with United States firms are greater than for Japanese, EU or other Southeast Asian firms. Due to a lack of strong evidence, we will include this factor in our study:

H6. Extent of technology transfer differs according to the country of origin of the subsidiary.

4.5.7 Experience of foreign firm

When a firm decides to go global, it faces a much more complex and relatively unclear environment compared to its home environment in terms of its economic, cultural and political dimensions. Therefore, it should not be expected that a newly established foreign firm in a particular host country will immediately develop local supplier linkages. As remarked by Giuliani (2008), the differences in behaviour between relatively young and old firms are important, as these differences can shed light on changes in the behaviour of

subsidiaries over time. It is then likely that the process of creating backward linkages and the transfer of technology would tend to expand over time.

Thus, the age of the subsidiary, which is the length of time spent in the host economy, may be a key factor in explaining the creation of linkages with local suppliers. The importance of the time derives from two reasons; first, the foreign firm gains experience about the local business environment over time. Such knowledge and experience will be complemented by the recruitment of local managers (Giroud, 2003). The time is significant to the foreign firm to identify the appropriate suppliers. It is then anticipated that the creation of backward linkages and the transfer of technology will evolve slowly and gradually. Second, after identifying the appropriate supplier firms, local suppliers need time to adapt themselves to meet a new customer's needs and specifications. As a result, linkages are becoming gradually stronger as a consequence of cooperation and business relationship with local suppliers. Kathuria (2000) also confirmed this, concluding that indirect gains or spillovers should not be assumed to be an automatic consequence of foreign firms' presence in developing economies.

Several studies have shown that the extent of technology transfer from foreign firms to local suppliers is generally affected by the length of time foreign firms spend in the host country (McAleese and McDonald, 1978; Giroud, 2003; Ivarsson and Alvstam, 2005b). At the same time, other MNCs studies show that the length of time spent on host country are not necessarily the decision factor on the process of creation backward linkages with local firms. For example, Tavares and Young (2002) found that the age of the subsidiary is negatively associated with import propensity. In this regard, Lall (2004) remarked that there are many instances where upgrading, linkages and spillovers have not grown over time. Thus, it can be hypothesised that:

H7. Experience of the subsidiaries in the host country is associated with greater backward linkages with local firms, and the transfer of more technology.

4.5.8 Geographic proximity

The decision to source locally in a host country depends also on the cost, quality, reliability and flexibility of local suppliers compared to suppliers abroad. Therefore, proximity is important in many sourcing choices. The proximity from suppliers can make procurement more flexible and easier to negotiate and monitor. The proximity is more significant particularly where the interchange of information and technical knowledge are required for efficiency (UNCTAD, 2001, P.136).

However, several studies suggest that different kinds of knowledge are transferred more effectively by face-to-face communication. Personal relations and face-to-face communication, therefore, are expected to be limited between distant firms. This in turn may lead to a lower level of knowledge transfer between foreign firms and their suppliers. Thus, one of the aims of this research is to identify the effect of distance between foreign firms and their local suppliers on the transfer of technology. In the case of purchasing from suppliers located abroad, higher transport costs may lead to a better probability of establishing linkages with local suppliers (Halpern and Muakozy, 2007). Therefore, it can be hypothesised that:

H8. Decreasing spatial distance between the foreign subsidiary and its local suppliers is associated with more extensive backward linkages and greater extent of technology transfer.

4.6 Summary

The chapter presented the research theoretical model and the justification for building the research theoretical model. The need for the study as well as our key indicators of technology transfer was also discussed. Based on the earlier literature, there are many factors that tend to affect the transfer of technology from foreign firms to local suppliers. This generates eight likely determinants which can be tested for their effect on the extent of technology transfer from foreign firms to local suppliers. Thus, we propose some hypotheses which will be tested in relation to the transfer of technology and knowledge to local suppliers.

Chapter Five

Research Methodology and Design

5.1 Introduction

Chapters 2 and 3 provided a literature review on backward linkages and transfer of technology. The orientation towards this particular area was mainly due to the need to explore more about the factors that affect transfer of technology from foreign firms to their local suppliers by backward linkages.

There are many research designs, strategies or approaches that could be used when conducting research. The nature or context of the research questions and objectives should follow and require a specific type of research design and strategy (Creswell 2003). Thus, researchers should be careful when choosing research methodologies; they need to spend some time considering alternatives before choosing the appropriate methodology to answer their research questions. However, the process of any research is the overall activities the researcher undertakes to find the answer(s) to his/her research questions and to achieve his/her research objectives. In other words, research methodology is concerned with approaches by which the researcher collects data to answer his or her research questions.

The purpose of this chapter is to describe the methodology that was applied for undertaking this research, to explain the stages that were undertaken and the methods the researcher employed to collect the data. This chapter is structured as follows: it starts with an overview of the research philosophy and design, including the types of research, followed by a detailed discussion of justifications for the research philosophy and design adopted in this research, including the population of the study and the choice of respondents. In addition, this chapter discusses the two main data collecting methods that were used in this research for primary data collection; namely, semi-structured interviews and personally administered questionnaires.

The contents of the final version of the questionnaire, the administration of the questionnaire, and reliability and validity evaluation have also been provided. Finally, the chapter ends with a detailed discussion and justifications of the statistical methods and techniques appropriate to answer the research questions and objectives.

5.2 Research Design and Philosophical Paradigm

Any research should be conducted based on principles of methodology. In this context, Eldabi et al. (2002) emphasised that conducting any type of research should be governed by a well-defined research methodology based on scientific principles. In addition, Punch, (2005, pp.62-3) indicates that research design, “at the most general level, it means all the issues involved in planning and executing a research project – from identifying the problem through to reporting and publishing the results....at its most specific level, the design of a study refers to the way a researcher guards against, and tries to rule out, alternative interpretations of results”.

Saunders et al. (2000) emphasise that it is important to have a clear research strategy (design), a general plan of how you go about answering the research questions.

According to Easterby-Smith et al. (2002, p. 27), an understanding of philosophical issues is very useful because:

1. It can help to clarify research designs.
2. It can help the researcher to recognise which designs will work and which will not. It should enable a researcher to avoid going up too many blind alleys and should indicate the limitations of particular approaches.
3. It can help the researcher identify, and even create, designs that may be outside his or her past experience. It may also suggest how to adapt research designs according to the constraints of different subjects knowledge structures.

Creswell (2003) also emphasises the critical link between the design of the study that refers to the overall approach followed to solve the particular research questions and the overall paradigm of scientific inquiry, which set the philosophical basis for the research.

However, it is important to distinguish between research design and research technique. According to Oppenheim (1992), *Research design* is a basic plan or strategy of the research and the logic behind it, which will make it possible and valid to draw more general conclusions from it. *Research techniques* are the methods used for data generation and collection.

Creswell (2003) argues that a researcher should choose his or her research design during the early stages of the research, because research design determines: (1) research methodology, (2) data collection methods, and (3) data analysis and interpretation methods. Oppenheim (2000) argues that choosing the best design or best method is a matter of appropriateness. No single approach is the best; it all depends on what is needed to be found and on the type of question the research aims to answer. In this context, Creswell, (2003, p.12) states, “individual researchers have a freedom of choice, they are “free” to choose the methods, techniques, and procedures of research that best meet their needs and purposes”.

Tabel 5.1 Implications of positivism and social constructionism.

	<i>Positivism</i>	<i>Social Constructionism</i>
The observer	Must be independent	Is part of what is being observed
Human interest	Should be irrelevant	Are the main drivers of science
Explanations	Must demonstrate causality	Aim to increase general understanding of the situation
Research progress through	Hypotheses and deductions	Gathering rich data from which ideas are induced
Concepts	Need to be operationalised so that they can be measured	Should incorporate stakeholder perspectives
Units of analysis	Should be reduced to simplest terms	May include the complexity of whole situation
Generalisation through	Statistical probability	Theoretical abstraction
Sampling requires	Large numbers selected randomly	Small numbers of cases chosen for specific reasons

Source: Easterby-Smith et al., 2002, p. 30

Hussey and Hussey (1997) defined paradigm as the progress of scientific practice based on peoples’ philosophies and assumptions about the world and the nature of knowledge. Paradigms offer a framework comprising an accepted set of theories, methods and ways

of defining data. However, according to Easterby-Smith et al. (2002), there are two main research philosophies or paradigms, positivistic and social constructionism. The implications of both philosophies are summarised in table (7.1).

According to Creswell (2003), the research methodology can be derived from three approaches. These approaches are: quantitative, qualitative, and mixed methods. The first two approaches can be classified into two main categories: a positivistic and phenomenological approach, respectively. These two categories are sometimes described by different terms. The positivistic approach is sometimes categorised as traditional, quantitative, or empiricist, whilst the phenomenological approach is sometimes categorised as post-positivistic, subjective, or qualitative (Hussey and Hussey, 1997). However, Hussey and Hussey (1997) indicate that the most popular terms across authors are quantitative and qualitative, and they summarise the features of the two main paradigms as shown in table (7.2). They also argue that the choice of either paradigm is dependent on the current knowledge of the topic under investigation, and the research objectives. Moreover, Saunders et al., (2000) indicate that both paradigms have an important part to play in business and management research.

Table 5.2 Features of the two main paradigms.

<i>Positivistic (quantitative) paradigm</i>	<i>Phenomenological (qualitative) paradigm</i>
Tends to produce quantitative data.	Tends to produce qualitative data.
Uses large samples.	Uses small samples.
Concerned with hypothesis testing.	Concerned with generating theories.
Data is highly specific and precise.	Data is rich and subjective.
The location is artificial.	The location is natural.
Reliability is high.	Reliability is low.
Validity is low.	Validity is high.
Generalises from sample to population.	Generalises from one setting to another.

Source: Hussey and Hussey, 1997, p. 54

Creswell (2003) defines the aforementioned three approaches as follows:

- A quantitative approach is one in which the investigator primarily uses post-positivist claims for developing knowledge, employs strategies of inquiry such as experiments, and collects data on predetermined instruments that yield statistical data.
- A qualitative approach is one in which the inquirer often makes knowledge claims based on constructivist perspectives for developing knowledge, employs strategies such as case studies, and collects open-ended data and emerging data with the primary intent of developing themes from the data.
- A mixed approach is one in which the researcher tends to base knowledge claims, employs strategies and collects data. The final database represents both quantitative and qualitative information.

The following sub-sections discuss in more detail the aforementioned three approaches.

5.2.1 Quantitative and Qualitative approaches

The quantitative and qualitative approaches to research have important differences but also share many similarities. According to Punch (2005), the main differences between the two approaches lie in the nature of their data, and in methods for collecting and analysing data. He indicates that these differences should not obscure the similarities in logic which make combining the approaches possible.

There are many types of methods that could be applied via a qualitative approach, such as case study, interviews, group discussion, participant observation, and documents and records analysis, while a survey strategy is the most typical quantitative strategy conducted by questionnaire, structured interviews and telephone interviews.

In terms of the purposes behind the two approaches, it has been argued that a quantitative approach is more concerned with the deductive testing of hypotheses and theories, whereas a qualitative approach is more concerned with exploring a topic, and with inductively generating hypotheses and theories (Hussey and Hussey, 1997; Punch, 2005).

Therefore, the quantitative paradigm tends to relate variables in hypotheses, which are tested later by employing statistical procedures. The results may or may not confirm the theory (Hussey and Hussey, 1997). In contrast, the qualitative paradigm requires clear knowledge about the phenomena under investigation, which are then tested in their wider context over time (Creswell, 2003).

Moreover, in describing the way researchers apply the quantitative approach, Creswell (1994: p.7) indicates: “By using a deductive form of logic wherein theories and hypotheses are tested in a cause-and-effect order. Concepts, variables, and hypotheses are chosen before the study begins and remain fixed throughout the study. One does not venture beyond these predetermined hypotheses. The intent of the study is to develop generalisations that contribute to the theory and that enable one to better predict, explain, and understand some phenomenon. These generalisations are enhanced if the information and instruments used are valid and reliable.”

Quantitative and qualitative approaches have their advantages and disadvantages. The main advantages for using qualitative research methods are identifying and clarifying specific responses, in particular, those related to the attitudes and behaviour of the respondents. In addition, qualitative methods assist in gaining more insights into people and situations, while helping the respondents to think about their own world and consider the way they construct their reality (Easterby-Smith et al., 1991).

Quantitative approach methods also have advantages and disadvantages. Easterby-Smith (1991) state the advantages are that quantitative methods can provide a wide coverage of the range of situations, and they can be fast and economical, whereas statistics are aggregated from large samples and may be of considerable relevance to policy decisions. The disadvantages are that the methods used tend to be rather inflexible and artificial, they are not very effective in understanding processes or the significance that people attach to actions, they are not very helpful in generating theories because they focus on what is or what has been recently, and they make it hard for policy makers to deduce

what changes and actions should take place in the future. In addition, Amaratunga et al. (2002) indicate that quantitative methodologies have the following strengths:

- Comparison and replication are allowable.
- Independence of the observer from the subject being observed.
- The subject under analysis is measured through objective methods rather than being inferred subjectively through sensation, reflection, or intuition.
- Reliability and validity may be determined more objectively than qualitative techniques.
- Emphasises the need to formulate hypotheses for subsequent verifications.
- Helps to search for causal explanations and fundamental laws, and generally reduces the whole to the simplest possible elements in order to facilitate analysis.

However, understanding the strengths and weaknesses of both paradigms provides the researchers with insightful aspects to their research situation. Examples of the strengths and weaknesses of the quantitative and qualitative paradigms are presented in Table 5.3:

Table 5.3 Strengths and weaknesses of research schools. Source: Amaratunga (2002, p.20)

<i>Theme</i>	<i>Strengths</i>	<i>Weaknesses</i>
Positivist (quantitative paradigm)	<ol style="list-style-type: none"> 1. They can provide wide coverage of the range of situation. 2. They can be fast and economical. 3. Where statistics are aggregated from large samples, they may be of considerable relevance to policy decisions. 	<ol style="list-style-type: none"> 1. The methods used tend to be rather inflexible and artificial. 2. They are not very effective in understanding processes or the significance that people attach to actions. 3. They are not very helpful in generating theories. 4. Because they focus on what is, or what has been recently, they make it hard for policy makers to infer what changes and actions should take place in the future.
Phenomenological (qualitative paradigm)	<ol style="list-style-type: none"> 1. Data-gathering methods seen as natural rather than artificial. 2. Ability to look at change processes overtime. 3. Ability to understand people's meaning. 4. Ability to adjust to new issues and ideas as they emerge. 5. Contribute to theory generation. 	<ol style="list-style-type: none"> 1. Data collection can be tedious and require more resources. 2. Analysis and interpretation of data may be more difficult. 3. Harder to control the pace, progress and end-points of research process. 4. Policy makers may give low credibility to results from qualitative approach.

5.2.2 Multi-methods approach (Triangulation)

The combination of the two paradigms has been described as “triangulation”. This concept refers to “the use of different data collection methods within one study in order to ensure that the data are telling you what you think they are telling you” (Saunders et al., 2000, p. 99). The triangulation concept is built on the assumption that it would reduce biases inherent in particular data collection sources and methods by using more than one data collection method.

However, according to Saunders et al. (2000), Easterby-Smith et al. (2002) and Creswell (2003), a few, pure quantitative or qualitative research projects are conducted by using one single paradigm and use its implications. Business research rarely falls under one specific research philosophy: namely positivism (quantitative) or phenomenology (qualitative). Therefore, much business research uses a combination of both paradigms. Punch (2005, P. 238) points out “we cannot find out every thing we might want to know using only one approach, and we can often increase the scope, depth and power of research by combining the two approaches”. Moreover, Saunders et al. (2000) emphasise that it is not only perfectly possible to combine approaches within the same piece of research, but it is often advantageous to do so.

Based on above arguments and debate, there are many advantages of this approach. Significantly, researchers can use different methods in combination in one single piece of research, either because of the research design or because they wish to support the results from one method with the results from another. The specific reasons for combining the approaches should be considered in particular situations in the light of the practical circumstances and context of the research.

According to Creswell (2003), another advantage of mixed methods is due to the fact that each research approach and method has its own strengths and weaknesses; for this reason, the data collected will be affected by these strengths and weaknesses. Therefore, combining or employing different approaches and methods in this study will cancel out a ‘method effect’ and combine the advantages for each method employed. In this context,

Punch (2005, p. 241) states that the “Methodological justification for bringing qualitative and quantitative approaches together. At a general level, the reasons for combining are to capitalize on the strengths of the two approaches and to compensate for the weaknesses of each approach”.

In addition, using triangulation in one study provides a kind of convergence of results and complements findings reached from analysing various observations and enhances the scope and breadth of a study (Creswell, 2003). Moreover, qualitative research may facilitate the interpretation of relationships between variables. A quantitative approach readily allows the researcher to establish relationships among variables, but is often weak regarding exploring the reasons for those relations. A qualitative study can be used to help explain the factors essential to the broad relationships that are established (Punch, 2005).

Using a mixed approach also increases validity because it ensures the variable variance is ascribed to the attribute of the subject examined rather than to the method used for investigation. In short, triangulation consists of crosschecking data for internal consistency and external validity, which are matters of concern for any study (Sekaran, 2003; Sounder et al., 2000). Punch (2005, p.241) also argues that the “findings from one type of study can be checked against the findings deriving from the other type. For example, the results of a qualitative investigation might be checked against a quantitative study. The aim is generally to enhance the validity of findings”.

Gilbert (1993: p.199), in identifying the importance of triangulation, states: “The notion of triangulation has become a salient feature of research methodology. In this framework, validity is seen as having both external and internal aspects and the achievement of validity, and indeed of the research task as a whole, requires a triangulation of research strategies”.

5.3. Type of Research

According to Sekaran (1992), research can be conducted for two purposes. The first is to solve a currently existing problem, and is called applied research; the second is to contribute to the general body of knowledge in a particular area of research, and is called basic or fundamental research. Accordingly, this study falls within basic research, because it aims to understand more about the extent to which transfer of technology takes place from foreign firms to their local suppliers and the factors that may affect this transfer.

The methodology that was used in this study could be described as a cross-sectional study adopting a multi-methods approach (quantitative and qualitative). It is a cross-sectional design in which the collection of data from the research population and respondents (purchasing managers) was carried out only once (Sekaran, 2003).

The purposes of this study can be classified as descriptive and other aspects as hypothesis testing. The essential difference between these types of studies lies in their objectives (Cooper and Schindler, 2001). The main aim of descriptive studies is to describe the characteristics of the variables (Sekaran, 2003), whereas the objective of hypothesis testing is to explain the nature of certain relationships. One of the aims of this study is to ascertain the extent of the transfer of technology from foreign firms to local suppliers, and which types of assistances foreign firms provided their local suppliers with. Therefore, this part of the research can be classified as a descriptive study. On the other hand, the research aims to investigate the impact of several contingent variables on the extent of transfer of technology. Thus, this part of the research can be classified as a hypothesis testing study.

The research is conducted through survey and interviews to explore the extent to which transfer of technology takes place from foreign firms to their local suppliers through backward linkages, and the main factors that affect this transfer in the context of Jordan's industrial sector.

5.4 The Chosen Research Design and the Justifications behind this Choice

Based on the aforementioned discussion and arguments, this research does not fall under one particular research philosophy: positivism or phenomenology. Rather, it is a mixture of the two philosophies or a mixture of deductive and inductive approach methods which facilitates a flexible research design.

After the researcher reviewed the literature of research methods in business studies generally, decided the research questions and objectives, in addition to considering all methodological limitations, criticisms and issues relating to this type of research, he found that the multi-methods approach (method triangulation) conducted through survey questionnaire and semi-structured interviews in a complementary and supplementary way rather than focusing on one approach, is an appropriate and flexible way to conduct this research. The rationale behind this choice is justified in the following:

1. In this research, it was clear from the beginning of the study that there was a lack of comprehensive information and data about foreign firms and backward linkages in Jordan, as is the case with most developing countries. Therefore, to formulate and conduct a questionnaire survey appeared to be the most suitable method to employ in this study in order to obtain a large amount of basic data on backward linkages and the assistances provided to local suppliers. On the other hand, this kind of information was not deemed to be enough to achieve the main purpose. In-depth data is needed to provide useful conclusions. According to Saunders et al., (2000), if a study deals with attitudes or feelings, it needs more emphasis on words than numbers. Thus, a richer source of information for exploring attitudes is through interviews.
2. The literature review on transfer of technology from MNCs to their local suppliers also revealed a need to conduct research surveys, because most previous studies tended to be concerned with conducting case studies. None of the previous studies tackled a sufficiently high number of companies to produce quantitative results, except for the studies carried out by Giroud (2003) and Halbach (1989), who used a mail survey.
3. The quantitative approach through questionnaires will allow gathering information from a sufficient number of firms, therefore quantitatively testing the assumptions described in the research. Thus, a comprehensively designed questionnaire was used as

the primary data collection method. Once the primary data collection tool (questionnaire) was developed, designed, and tested, a survey was conducted. Therefore, the quantitative research paradigm employed by the present research was used as a dominant research paradigm in order to investigate its questions and to meet its objectives.

4. Saving time and effort. A cross-sectional study adopting a multi methods approach leads to saving time, efforts, and resources required in comparison with longitudinal methodologies (Creswell, 2003).
5. A qualitative element for the primary data collection was used also to enhance and compliment the quantitative data, as the research is designed to explore (in detail), evaluate and assess the effect of backward linkages on transfer of technology from foreign firms to their local suppliers, and the problems and obstacles that affect this transfer. However, these relations might be affected by many variables; therefore, there will be complexity. This is why the qualitative approach is needed to enhance and compliment the quantitative data, because qualitative data will help to obtain the manager's opinions on their relationship with their local suppliers.
6. The crucial aspect in justifying a mixed methodology research design is that both single methodology approaches, quantitative only and qualitative only, have strengths and weaknesses. Therefore, the combination of methodologies can focus on their relevant strengths and reduce weaknesses and negative effects (Amaratunga et al., 2002, Saunders et al., 2000). This leads to more confidence in the research findings and conclusions.
7. Quantitative and qualitative research combined provides a general picture. The addition of some quantitative evidence may help to mitigate the fact that is it often not possible to generalise the findings deriving from the qualitative research (Punch, 2005).
8. Based on the complex nature of the research questions and objectives, this research includes many variables or factors and attitudes. These need to be investigated and measured through the qualitative and quantitative approach because any tool for data-gathering provides only one picture of the research, and the use of multiple techniques helps to enrich the understanding of what is going on.

9. This approach enables methodological triangulation, which refers to using different data collection methods within one study in order to ensure that data is telling you what you think it is telling you; in other words, to generate more validity and reliability (Saunders et al., 2000).
10. Statistical analysis of the quantitative data collected will make summaries, comparisons and generalisations relatively easy and accurate, while the qualitative data will provide an explanation and description of events, actions, attitudes, behaviours, and lead to more meaningful and new ideas from the perspective of the subjects being investigated (Bryman, 1988, p.61). This will provide a more rigorous understanding of the subject under investigation.

5.5 Population of the Study

The term population refers to the entire group of people, events, or things of interest under investigation, and the population frame is a listing of all the elements in the population from which the sample is drawn (Sekaran, 2003). The population for this research is defined as all of the foreign manufacturing and assembling firms operating in garment, chemical, electric, electronic, and engineering industries, and this research is targeted towards Jordan. Due to the fact that the population of this research is small, the sample targeted the entire population. In this context, Easterby-Smith et al. (2002) point out that when the population is small (perhaps less than 500), it is customary to send the questionnaire to all members. This 100 percent sample is known as a census.

The list of foreign firms was obtained from many resources; Free Zones Corporation, Industrial States Corporation, Qualified Industrial Zones Corporation, Amman Chamber of Industry, and Ministry of Trade and Industry. As mentioned earlier in Chapter Two, most of the foreign firms are concentrated in a few major areas; in Qualified Industrial Zones, Industrial states and Free Zones, and some outside of these areas. These areas are very developed in terms of infrastructure and other industrial facilities.

As mentioned in Chapter Two, the researcher considered firms with at least ten per cent foreign equity as foreign firms, following Sinani and Meyer (2004). Manufacturing and

assembly firms were included in this research, whereas non-manufacturing firms, such as trading, consultancy and other services were excluded. Industries without a significant foreign presence were excluded, such as food and tobacco manufacturing. The entire population was targeted except the companies that were classified as trading rather than manufacturing, and those industries without a significant foreign presence. This means the research population consists of two hundred twenty three manufacturing companies, all of which were targeted. The main reason for choosing almost the entire population is to ensure that the sample is representative and not biased, and also due to the small population. The garment, chemical, engineering, and electric and electronic industries are all targeted in this research. The logic behind choosing these firms is due to the following:

1. Presence of these firms. It is most likely to find backward linkages and subsequently transfer of technology in these sectors compared to other industries, such as food industries and mining industries.
2. Depending on one industry limits the ability to generalise the results of this research.
3. Due to the limited number of foreign firms, the four industrial sectors have been chosen to increase the sample under study, and to allow for comparison between these industrial sectors regarding the transfer of technology in order to fill the gap in previous studies, which only concentrated on one industry sector.
4. The number of firms in one industrial sector is insufficient, because it doesn't allow for using advanced analyses techniques. However, a survey of one industrial sector was avoided due to the limited number of foreign firms. The justifications for targeting the manufacturing and assembling firms are:
 - A. The manufacturing sector is more relevant and clearly reflects the constructs of this research, since its variables are related to manufacturing rather than services. This does not mean that the transfer of technology is exclusive to manufacturing companies; but that the creation of backward linkages and transfer of technology is more related to companies that practise their activities in the industrial sector.
 - B. The manufacturing industry sector was chosen because the relations between customers and suppliers in this sector are often characterised by a high degree of

interaction compared to the services sector, which may result in close technology linkages.

- C. Manufacturing firms were targeted due to the difficulty of designing a single questionnaire applicable to both services and manufacturing companies.
- D. Most of the previous literature on transfer of technology focuses on conducting the empirical studies in the field of manufacturing.
- E. Due to the increase of industrial foreign companies numbers operating in Jordan.

Studies on the transfer of technology from foreign firms to local suppliers in general are relatively few. However, there is a shortage of empirical studies concerning transfer of technology in Jordan. To the present researcher's knowledge, no similar study has been undertaken in examining technology transfer in Jordan. The researcher has reviewed the published literature in the field of transfer of technology in Jordan, and has found no related studies of the transfer of technology from foreign firms to local companies. This point emphasises that as a developing country, Jordan needs empirical studies which might support decision makers to have useful information to make their future policies.

In addition, Jordan has been chosen as a place to conduct this research because it is the home country of the researcher, meaning the researcher is able to collect the required data for his research without any difficulties regarding language, cultural difference, time issues, and so on.

5.6 The Choice of Respondents

In order to fulfil the research objectives, the responses and answers should be taken from the most qualified people who are experienced enough to provide valid responses to the questions. According to Oppenheim (1992), the selection of respondents depends on the characteristics required by the research design. The researcher made considerable efforts to identify the names and job titles of the targeted respondents in order to ensure they had a sound knowledge of their relationships with their suppliers. However, the research questions and objectives require selecting particular respondents who are considered to be informed and who have the required information to answer the research questions.

Thus, purchasing managers, or those who represent them, were selected as targeted managers to fill in the questionnaire due to the following justifications:

1. Measurements of the research variables were done based on the backward linkages and transfer of technology literature. Thus, purchasing managers or those who represent them are the most qualified people to provide their responses to questions included in the questionnaire. They are in the best position to provide the required information as well as having the most knowledgeable people in the surveyed firms about their relationships with their suppliers.
2. The procurement of the inputs is one of the most important activities of the purchasing department in any firm. This stresses the importance of obtaining their views, opinions and attitudes in relation to understanding the whole picture of their relationship with their suppliers rather than any other managers.
3. Most of the research variables place an emphasis on purchasing managers who are able to understand and provide valid responses to the questions. Therefore, their opinions and attitudes towards their relationships with their suppliers are very important for this study. In addition, they are one of the key influential decision makers with respect to their relationships with their suppliers.
4. The study has a comprehensive questionnaire that includes many questions relating to foreign firms' relationships, problems and many other issues with local suppliers. This also confirms the need for obtaining the information or answers from the people who have them; those in charge of the procurement for the inputs.
5. Several backward linkages and transfer of technology studies (e.g. Giroud, 2003; Driffield and Noor, 1999) addressed their mail questionnaires to the purchasing managers as appropriate persons to complete the questionnaire.

However, in some firms purchasing department is a section or unit of operation department, and sometimes, operations managers are responsible for procurement of the inputs.

5.7 Data Collection Methods

Data collection methods are an essential part of research design. The use of appropriate methods greatly enhances the value of the research. Data can be collected in a variety of

ways, in different settings and from different sources. However, there are several data collection methods, and each has its own advantages and disadvantages. The three main data collection methods are interviews, questionnaires and observations (Sekaran, 2003, p.223). As mentioned earlier in this research, in order to answer the research questions and meet the objectives, the decision was made to adopt multi-methods approach through applying both face-to-face interviews and self-administered questionnaires in a complementary or supplementary way.

Combining interviews and questionnaires in this research helps generate deeper insights and better understandings in order to reveal further facts about the research dimensions. Also it helps in understanding the facts supporting the questionnaires' answers and identifies many other important themes and facts related to the relationships between foreign firms and their suppliers. In order to achieve the research objectives effectively, validity and reliability have been taken into consideration.

According to Saunders et al. (2000), self-administered questionnaires are divided into three types, including: on-line questionnaire, postal questionnaire, and delivery and collection questionnaire. Each type has its advantages and disadvantages, but considering the advantages of the delivery and collection of the questionnaire method in comparison with other data collection methods, the researcher himself distributed the questionnaires and collected the greatest possible number of them to ensure a high response rate and to take advantage of personal contacts to enhance respondent participation.

Oppenheim (1992, p. 103) states: "the self-administered questionnaire is presented to the respondents by an interviewer or by someone in an official position. The purpose of the inquiry is explained, and the respondent is left alone to complete the questionnaires, which will be picked up later. This method of data collection ensures a high response rate, accurate sampling and a minimum of interviewer bias, and giving the benefit of a degree of personal contact". In the same vein, Sekaran (2003) states a number of advantages of using personally administered questionnaires, specifically:

- All the completed responses can be collected within a short period of time.

- The ability to clarify any doubts about the questions included in the questionnaire that the respondents might have regarding any question.
- There is an opportunity to introduce the research topic and motivate the respondents to give their answers honestly.
- Personally administered questionnaires are less expensive and less time-consuming than interviews.

However, the choice of data collection methods depends on the facilities available, the degree of accuracy required, the expertise of the researcher, the time span of the study, the nature of the study, research approach (qualitative or quantitative or both), research questions and objectives, and other costs and resources associated with data gathering (Sekaran, 2003).

Questionnaires and interviews are used extensively in surveys (Easterby-Smith et al., 2002). Therefore, these two methods are discussed in the following sub-sections.

5.7.1 Interviews

One method of data collection is to interview respondents to obtain information on the subject of interest. Interviewing is a very flexible technique. Interviews can be structured or unstructured, and conducted either face to face, by telephone, or online. Each one of these methods has its advantages and disadvantages (Hussey and Hussey, 1997). There are several styles, each with rather different aims and based on different principles. At one extreme, the interviewer simply reads out a list of questions and alternative responses to the person being interviewed, who then has to pick from the options offered. At the other extreme, the interviewer adopts a non-directive, almost conversational style. Semi-structured interviews lie between these extremes (Sekaran, 2003).

Semi-structured interview means that the interviewer sets up a general structure by deciding in advance what ground is to be covered and what main questions should be asked. This leaves the detailed structure to be worked out during the interview. The person interviewed can answer at some length in his or her own words, and the

interviewer responds using probes and follow-up questions to get the interviewee to clarify or expand on answers (Easterby-Smith et al., 2002, Sekaran, 2003).

In this study, the semi-structured interview was considered one of the most appropriate approaches, as it allows the researcher to ask each respondent a list of carefully constructed questions prepared beforehand, while giving flexibility to discuss unexpected responses which may reveal further issues. The researcher used personal face-to-face interviews, rather than telephone interviews, for three reasons. First of all, the nature of the research is concerned with foreign firm's relationships with their suppliers and needs a confidential atmosphere which cannot be guaranteed in telephone interviews. Second, the researcher wished to deal personally with managers in order to build up a relationship of trust. Third, collecting data by telephone is not a popular method in Jordan because it is considered socially unacceptable. Therefore, a face to face approach was considered to be the most efficacious way to communicate with managers. However, in all cases the interviewees were guaranteed anonymity, which can be an issue when conducting face to face interviews.

The interview schedule was designed to complement the questionnaire. The researcher interviewed 13 managers from the MNCs that have backward linkages. To ensure that the content, language, format and plan were satisfactory, the researcher discussed the interview schedules with two Ph.D. colleagues at the University of Huddersfield, along with two lecturers from both public and private Jordanian Universities.

The researcher arranged meetings with the purchasing managers to establish a mutual rapport; for example, to explain who the researcher was, what the research aims were, what the procedure would be, and to ensure that they had been fully informed. Such meetings were also held to inform them of the following terms:

- The data collected would be solely for academic purposes, and any contribution would be confidential and anonymous.
- There was no obligation on anyone to participate. Also, they were free to withdraw from the research at any time.

- The data gathered during the interview, if written up or discussed with other people, would be anonymous and presented in such a way as to ensure that it was not possible to identify the individual participant.

5.7.1.1 Interview Rationale

As mentioned earlier, the choice of methods arises from the nature of the research itself. The main purpose of the interviews was to provide more detailed information relating to the major areas of the research than could be collected through the questionnaires alone. They were also conducted in order to scrutinise and verify the finding of the questionnaires.

The aim was to learn more about the relationships between foreign firms and their local suppliers, the assistance provided to local suppliers and the reasons for not creating backward linkages concerning the firms that have no backward linkage at all. In-depth information gained by interviews would produce more details than by only using the questionnaire. According to Saunders et al. (2000), it is useful to use both methods since interviews provide a depth of explanation within a particular context whilst questionnaires provide a broad, possibly superficial picture. An interview is a flexible technique, suitable for gathering information and opinions, and for exploring people's thinking and motivations. In addition, interviews can yield rich material and often put flesh on the bones of questionnaire responses (Sekaran, 2003). Interviews have many definitions; for example, it could be defined as a two-person conversation initiated by the interviewer for a specific purpose in order to obtain research-relevant information, or focused by the interviewer on content specified by research objectives of systematic description or explanation (Saunders et al, 2000).

Interviews are then thought to be suitable for collecting data because they have many advantages. According to Oppenheim (1992); Saunders et al, (2000); Cooper and Schindler (2003); and Sekaran (2003), the advantages and disadvantages of the interviews can be summarised as follows:

1. A major advantage of the interview is its adaptability. A skilful interviewer can follow up ideas, probe responses when he wants his interviewees to explain their responses, and investigate motives and feelings which the questionnaire can never do (Saunders et al, 2000).
2. Interviews have higher response rates than questionnaires.
3. It provides an opportunity to explore the reasons behind the interviewee's answers and to verify the reliability of those answers with further questioning (Sekaran, 2003).
4. They also provide an opportunity to contact interviewees and motivate them to provide additional information and reliable answers or to seek an explanation to avoid misunderstanding (Cooper and Schindler, 2001).
5. The greatest value lies in the depth of information and detail that can be obtained (Cooper and Schindler, 2003).
6. It may also lead the discussion into areas which have not been previously considered as important to the research. Therefore, it enables the researcher to collect a rich set of data, which leads to more understanding and helps the researcher to address his research questions and objectives (Saunders et al, 2000).

On the other hand, interviews have some disadvantages, such as:

1. Interviews take time and they are expensive. It was indicated by Oppenheim (1992, p. 83) that interviews might take weeks if not months to complete the study.
2. Interviews are much more expensive than questionnaires, taking into account travelling costs, time taken, and other communication expenses. Accordingly, interviews cannot be used to cover a large number of people or firms, especially when a wide geographic region is covered (Sekaran, 2003).
3. Analysing and presenting responses can present problems when interviews are used, particularly where there are many open questions, or where the data is not in a standardised format.
4. There are also risks of interviewer bias.

However, interviews used in this research were conducted in order to complement, support, and explain ideas and thoughts that may emerge from the survey.

5.7.2 Questionnaire types and formats

Before designing the study questionnaire, which took many steps, the researcher reviewed other literature and research, such as journal articles, theses, and books related to FDI, multinational corporations, backward linkages, transfer of knowledge and technology, and various references regarding research methods. He also reviewed similar questionnaires. All this helped to set the questionnaire design in the context of previous work.

A questionnaire is a list of carefully structured questions, chosen after considerable testing to achieve a reliable response from a chosen sample (Hussey and Hussey, 1997). It is defined as “a reformulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives” (Sekaran, 2003, p.236).

Questionnaires are used widely in social science research and have the advantage of obtaining data from a large number of respondents in an economic way (Sekaran, 2003). A questionnaire survey is often cheaper and less time-consuming than conducting interviews (Frankfort-Nachmias and Nachmias, 1996; Hussey and Hussey, 1997). This type of data collection method can be used for descriptive or explanatory research (Saunders et al., 2000).

Many researchers have discussed the advantages and disadvantages of using questionnaires. However, according to Oppenheim (1992); Saunders et al., (2000); Cooper and Schindler (2003); and Sekaran, 2003) they are:

1. The questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyse.
2. Cheap to administer. To distribute questionnaires over a wide area is cheap compared to sending researchers or conducting interviews. This is especially advantageous when conducting an investigation which involves samples which are geographically, widely dispersed.

3. Quicker to administer. Questionnaires can be sent out by mail or distributed in large quantities at the same time. The time taken to conduct interviews involving a team of researchers would take longer and be very expensive with the same number of subjects.
4. Absence of interviewer effects. Characteristics of interviewers and respondents may affect the answers people give. It has been suggested that factors such as ethnicity, gender and social background of the interviewer may affect the answers the respondents provide.
5. No interviewer is present when a self-completion questionnaire is used; therefore, the interviewer effects are eliminated.
6. No inter-interviewer variability. Self-completion questionnaires do not suffer from the problem of interviewers asking questions in a different order or in different ways.
7. Convenience for respondents. Self-completion questionnaires are easy for respondents to complete because they may complete them when they want and at a comfortable speed.

On the other hand, some writers (e.g. Saunders et al., (2000); Cooper and Schindler (2003); Sekaran, 2003) argue that questionnaires have their disadvantages, such as:

1. The information collected tends to describe rather than give an explanation of why things are the way they are.
2. The information can be superficial.
3. The time needed to draft and pilot the questionnaire is often underestimated, and so the usefulness of the questionnaire is reduced if preparation has been inadequate.
4. Questionnaires can also reflect the perspectives of the writer and may not address the concerns of the respondent.

The researcher has noted from the beginning of the research the shortage of information and limited amount of literature regarding foreign firms and backward linkages in Jordan. Therefore, there was a need to carry out the survey questionnaire.

The researcher also carried out the survey questionnaire for many reasons; it is relatively cheap and quick to administer, to acquire information from a large number of people within a limited time. Moreover, it is best for the nature of this study, as it deals with

foreign firms and their relationships with their local suppliers, which may be sensitive, and it allows managers to state their opinions anonymously and in their own time.

Several researchers (e.g. Saunders et al. 2000; Easterby-Smith et al., 2002; Sekaran, 2003) stress that questionnaires are the most popular method for collecting data and can be administered personally, electronically distributed (on-line questionnaires), or mailed to respondents (posted or mail questionnaire). The next sub-sections consider in more detail these types of questionnaires.

5.7.2.1 On-line questionnaires

The on-line questionnaire is a new approach similar to a postal survey, except this type of questionnaire is delivered and returned electronically using either e-mail or the web site (Saunders et al., 2000). Their strengths and weaknesses rely on the design and the administration of the questionnaire. The e-mail questionnaires have several advantages: First, the elimination of paper costs and the reduction in distribution time. Second, the response rate should increase because the researcher can make direct contact with the respondents. However, they also have disadvantages. First, not everyone has access to electronic addresses and there is difficulty in determining the respondent's email address. Second, there is a problem of anonymity. Alternatively, the questionnaire can be advertised on the internet and respondents invited to participate in filling it in, but there is no guarantee of ensuring an acceptable response rate and there are considerable challenges of non-response bias (Saunders et al., 2000).

5.7.2.2 Mail questionnaires

Postal questionnaires are a commonly used method in gathering data in social sciences (Oppenheim, 1992). In the postal method, the questionnaire is posted to the respondents with a cover letter and prepaid envelope for returning the completed questionnaire. To enhance the response rate, reminder notes may be sent later to the people.

This type of questionnaire can therefore be used for descriptive studies, as well as examining and explaining relationships between variables (Saunders et al., 2000). As with the other methods of data collection, this type of questionnaire has several

advantages and disadvantages. The advantages are that they are particularly useful when large numbers of respondents need to be reached in different geographical regions. Another advantage of mail questionnaire is that respondents can take their time to respond at their convenience (Sekaran, 2003). Moreover, mail questionnaire is the lowest cost of data collection and processing (Cooper and Schindler, 2001). The main weakness of postal surveys is the low response rate (Hussey and Hussey, 1997; Cooper and Schindler, 2001). Also, one of the disadvantages of the mail questionnaire is that any doubts or misleading items cannot be clarified (Sekaran, 2003). In addition, those who respond may not be representative of the target survey population; therefore, the researcher cannot be sure the targeted respondents have completed the questionnaire (Oppenheim, 1992).

5.7.2.3 Personally administered questionnaires

The personally administered questionnaire is usually presented to the respondents by an interviewer or someone in an official position (Oppenheim, 1992). This type of questionnaire takes two forms in terms of the distribution method. The first form is self-administered questionnaires, in which the interviewer presents the questionnaire to the respondent, and then the respondent is left alone to complete the questionnaire. The second form is group-administered questionnaires, which are also given to groups of respondents assembled together in order to complete it. This type of questionnaire has many advantages. According to Sekaran (2003), the main advantage of personally administered questionnaires is that the researcher collects the completed responses within a short period of time, and any misleading questions can be clarified to the respondents. There is also an opportunity to introduce the research topic and motivate the respondents to give their answers honestly. Moreover, personally administered questionnaires are less expensive and less time-consuming than interviews, especially when distributed to groups of respondents. Moreover, one of the important advantages of self-administrated questionnaires is higher response rates (Oppenheim, 1992). In this context, Oppenheim (1992: p.103) states that “the self-administered questionnaire is presented to the respondents by an interviewer or by someone in an official position. The purpose of the inquiry is explained, and the respondent is left alone to complete the questionnaire, which

will be picked up later. This method of data collection ensures a high response rate, accurate sampling and a minimum of interviewer bias, and giving the benefit of a degree of personal contact”.

Based on this discussion, the survey instrument was considered most appropriate because it provides a large amount of cross-sectional data needed for this study. Considering the above-mentioned advantages of a personally administered questionnaire compared with other data collection methods, the researcher himself distributed the questionnaires and personally collected as many of them as possible to ensure a high response rate and to take advantages of personal contact, since this method enhances respondent participation.

5.8 Questionnaire construction and pre-testing

Developing a good questionnaire required a series of measures in order to achieve the objectives of the study. The questionnaire should translate the research objectives into specific questions in order for the answers to provide the data for hypothesis testing. The key considerations involved in formulating questions are their content, structure, format and sequence (Frankfort-Nachmias and Nachmias, 1996, p.250).

The main source for determining the content of the questionnaire was the literature on backward linkages and transfer of technology. This major source was identified in order to maintain and maximise the reliability and validity of the questionnaire, and to compare the result of this study with other related studies. Therefore, the study questionnaire was derived from different studies (Halbach, 1989; Driffield and Noor, 1999; Giroud, 2003; Carrillo, 2001). Most of the questions used in this study were adapted from published research (with, of course, making some necessary modifications to the original content to be applicable to the Jordanian context). In addition, the researcher made contacts with several researchers to discuss the contents of the questionnaire.

The adoption of wording and the overall layout in building the questionnaire are key issues (Frankfort-Nachmias and Nachmias, 1996). Therefore, significant attention was given to choice of wording, design, layout and pre-testing. However, in this crucial stage,

it was essential that careful and detailed procedures were considered to develop a well-designed questionnaire because it offers only one chance to collect the data (Saunders et al., 2000). A number of drafts were conducted and assessed before producing the final version of the questionnaire. The questionnaire implemented in this research (see Appendix A) consists of seven A4 sized pages.

In addition, it is necessary to choose the question types to use (closed or open ended questions). Thus, the next sub-sections consider, in more detail, the stages of constructing questions and the pre-survey issues and the pilot study.

5.8.1 Question types and format

Several researchers (e.g. Oppenheim, 1992; Saunders et al., 2000, Sekaran, 2003) suggest using guidelines for designing questions. In this context, Sekaran (2003, p. 237-238) indicated there are three important issues in designing the questionnaire. These are related to the wording of the questions, the general appearance of the questionnaire and how the variables should be categorised, scaled and coded. All three are important issues in questionnaire design because they can minimise biases in research. If some questions are either not understood or interpreted differently by the respondents, the researcher will obtain the wrong answers to the questions, and responses will thus be biased.

However, all the suggested guidelines were taken into account to minimise biases in this research. Efforts were made to word the questions in a way that could be understood by the respondents. Simple and clear terms were used that are likely to be familiar to, and understood by, respondents in order to provide one possible meaning, to avoid ambiguity, and to improve the validity of the questionnaire. If a question can be misunderstood it will be misunderstood by someone or other. Therefore, efforts were made to clarify and refine questions. The researcher also tried to avoid asking questions that made major demands on the respondent. The researcher also avoided asking leading questions. In general, questionnaires were kept as short as possible, and if a question was non-essential, it was eliminated.

Moreover, the cover letter mentioned the aim of the study and a guideline statement was included before respondents answer all the questions in each section of the questionnaire. However, according to (Hussey and Hussey, 1997; Sekaran, 2003), a researcher can use two types of questions for constructing the questionnaire - the open-ended and close-ended types. Open-ended questions are used widely in in-depth and semi-structured interviews. Open-ended questions allow each respondent to give a personal response or opinion in his/her own words. In these types of questions the researcher does not provide any set of responses. Instead, the respondents are free to give answers in their own way, while close-ended questions allow a respondent to select the answer from a number of predetermined alternatives. They usually help the respondents to make quick decisions to choose among the several alternatives provided to them; they require minimal writing and they also help the researcher to code the information easily for subsequent analysis.

Closed questions can be classified according to Saunders et al., (2003, p.292) into the following types:

- List questions: This type offers the respondent a list of responses, any of which they can choose. Such questions are useful when the researcher needs to be sure that the respondent has considered all possible responses.
- Category questions: This type is designed so that each respondent's answer can fit only one category from a given set of categories. Such questions are useful to collect data about behaviour or attributes.
- Ranking questions: This type is where the respondents are asked to place things in rank order. Such questions are useful to researcher to discover the relative importance of the respondents.
- Quantity questions: The response to this type is a number, which gives the amount of a characteristic. This type tends to be used to collect behaviour or attribute data.
- Grid questions: This type enables the researcher to record the responses to two or more similar questions at the same time.

- Scale questions: This type is often used to collect opinion data. The most common approach is the Likert Scale, in which the researcher asks the respondents how strongly they agree or disagree with a statement or series of statements.

According to Cooper and Schindler (2006, P.367), several situational factors affect the decision of whether to use open-ended or close-ended questions. These factors are:

- Objective of the study
- Participant's level of information about the topic
- Degree to which participant has thought through the topic
- Ease with which participant communicates
- Participant's motivation level to share information

Experience has shown that closed questions typically require less motivation and answering them is less threatening to respondents (Cooper and Schindler (2006).

Moreover, they argue that closed-ended questions are used largely in a questionnaire survey and are generally preferable in large surveys. They also argue that closed questions reduce the variability of response, make fewer demands on interviewer skills, are less costly to administer, and are much easier to code and analyse. Table 5.4 illustrates the main advantages and disadvantages of open and closed questions.

Among these types of questions, several open questions were used in this research in the form of "other, please specify" to give respondents the opportunity to express their views on specific questions or to add additional insights or comments. Also, open questions were used in section A of the questionnaire (see Appendix A for a copy of the final version of the questionnaire) to obtain information about the year in which the firm was established in Jordan, the year in which the firm began production, the number of employees currently employed in the company, the nationality of the general manager, the percentage of local sale, and the percentage of exports.

Table 5.4 Advantages and disadvantages of open questions and closed questions. Combined from Bryman and Bell (2007) and Cooper and Schindler (2006).

<i>Open questions advantages</i>	<i>Closed questions advantages</i>
<ol style="list-style-type: none"> 1. Allow participants to craft their own responses in their own words. 2. They allow unusual responses to be derived. 3. The questions do not suggest certain kinds of answer to respondents. 4. They are useful for exploring new areas. 5. They are useful for generating fixed-choice format answers. 	<ol style="list-style-type: none"> 1. Help the respondents to make quick decisions. 2. Enhance the comparability of answers. 3. May clarify the meaning of a question for respondents. 4. Easy to complete. 5. Reduce the variability of response. 6. Makes fewer demands on interviewer skills. 7. Closed questions are less costly to administer. 8. Easier to code and analyse. 9. Less costly to administer. 10. They require minimal writing. 11. In interviews, closed questions reduce the possibility of variability in the recording of answers in structured interviewing.
Open questions disadvantages	Closed questions disadvantages
<ol style="list-style-type: none"> 1. They are time consuming for the interviewer to administer. 2. Answers have to be “coded”. This is very time-consuming. 3. They require greater effort from respondents. 4. May discourage busy respondents from replying to the questionnaire 5. There is the possibility in research based on structured interviews of variability between interviewers in the recording of answers. 	<ol style="list-style-type: none"> 1. There is a loss of spontaneity in respondents’ answers. 2. It can be difficult to make forced-choice answers mutually exclusive. 3. It can be difficult to make forced-choice answers exhaustive. 4. There may be variation among respondents in the interpretation of forced-choice answers. 5. May be irritating to respondents when they are not able to find a category that they feel applies to them. 6. In interviews, a large number of closed questions may make it difficult to establish rapport.

Open questions were also used in section D to obtain information about the percentages of internal purchasing and the percentage of material, parts and components the firm purchased from Jordan. Some authors (e.g. Nachmias, 1996) recommended that obtaining real numbers and dates are more accurate in open-ended questions than close-ended questions. Finally, this type of question was used in section F to obtain information about the respondents and to provide the respondents with a space to comment on the questionnaire. The reason for using a limited number of open questions is because these questions may discourage busy respondents from replying to the questionnaire (Hussey and Hussey, 1997).

The main types of questions used in this research were closed questions. Three types of closed questions were used in this research.

Category questions were designed so that each respondent's answer can fit only one category. For these types of questions, care was taken to ensure that the alternatives are mutually exclusive and collectively exhaustive. This type of question was used in the questionnaire in section A, question A7, where the respondent was given five activities and asked to select the one that best describes his/her company's activity in Jordan. Question A8, the respondent was given five industry types and asked to determine the one that best describes his/her company's industry type. Question A9, the respondent was given four categories of ownership configurations of his/her company and asked to determine the one that best describes his/her company's ownership configurations. Finally, question C1 provided the respondent with four choices concerning the decision making of the major inputs and asked the respondent to select one of these categories.

Finally, the scale questions were extensively used throughout the questionnaire sections to measure research variables. Scale questions allow participants to give more discriminating responses (Hussey and Hussey, 1997). Five types of five-point Likert scales were used in this research.

The first Likert scale was used in section B; this question is supplementary. The respondents were asked to indicate how important they believed each given reason of initial investment in Jordan. Five response categories were given to the respondents, ranging from: "Not at all important" (1), "Unimportant" (2), "Moderate important" (3), "Important" (4), "Extremely important" (5).

The second Likert scale was used in question D4. The respondents were asked to evaluate their local supplier's performance in terms of the criteria provided. Five response categories were given to the respondents, ranging from (1) Very poor, (2) Poor, (3) Satisfactory, (4) Good, (5) Very good.

Question D5 used the third Likert scale for the obstacles of forging long-term linkages with local suppliers. Five response categories were given to the respondents, ranging from: (1) To a very small extent, (2) To a small extent, (3) To a considerable extent, (4) To a great extent, (5) To a very great extent. The respondents were asked to indicate the degree of how well they relate to each statement included in the question.

Section E (questions E1, E2, E3, and E4) used the fifth Likert scale to measure the research dependent variables. These variables include the transfer related to the product, process, management, marketing, finance, and transfer by training. Five response categories were given to the respondents, ranging from (1) Never, (2) Rarely, (3) Sometimes, (4) Mostly, and (5) Always. The respondents were asked to indicate the degree of frequency with each given statement of assistance provided to local suppliers. However, the previous research (e.g. Giroud, 2003, Halbach, 1989) used a three-point Likert scale to measure the dependent variable. Therefore, in order to provide a greater opportunity for respondents to answer the questionnaire, five-point Likert scales were used throughout the questionnaire. In this context, Hair et al., (2003, p. 159) argues that the more points researchers use, the more precision they get on the extent of the agreement or disagreement with a statement.

5.8.2 Questionnaire layout and flow

Saunders et al., (2003); Sekaran, (2003); and Hair et al., (2003) suggested other issues relating to questionnaire layout and flow as an essential part of constructing the questionnaire. For example, Saunders et al. (2003, p. 304) indicated the layout of the questionnaire should be attractive to encourage the respondents to fill it in and return it.

Another important issue that should be taken into consideration when designing the questionnaire is the length of the questionnaire, because the length of the questionnaire is likely to affect the response rate. However, the general view is to keep the questionnaire as short as possible to avoid a low response rate. According to Saunders et al. (2003), p. 304, a length of between four and eight A4 pages is acceptable. In this research

questionnaire seven A4 pages were used to cover all the research variables, which is consistent with Saunders et al.'s (2000) recommendation.

The order and flow of questions should be taken into consideration when designing the questionnaire as well (Saunders et al., 2000; Sekaran, 2003). Therefore, the order of the questions was based on the funnel approach; from questions of a general nature to those which are that are more specific, and from questions that are relatively easy to answer to those relatively more difficult. This approach facilitates the easy and smooth progress of the respondents through the items in the questionnaire and to motivate them. Personal questions appear at the end of the questionnaire so that the respondents, when they reached the end of the questionnaire, would have been convinced of the legitimacy and genuineness of the questions framed; hence, they would be more inclined and amenable to share personal information (Sekaran, 2003).

A good questionnaire should include precise instructions to the respondents. Thus, the questionnaire consisted of clear instructions to the respondents at the beginning of the questionnaire. In addition, splitting questions between pages or asking a question on one page and asking for the response on another was avoided. Finally, each questionnaire was numbered to enable the researcher to check the responses and send out reminders to non-respondents.

5.8.3 Questionnaire pre-testing and pilot work

Prior to using the questionnaire to collect the data, it is essential for a researcher to pilot or test the questionnaire. The purpose of piloting the questionnaire is to be sure that it is clear, well designed, understandable, and contains all the statements necessary for measuring the research variables. Therefore, the respondents will have no problems in answering and recording the questions. Piloting the questionnaire will enable the researcher to obtain some assessment of the questions' validity and the likely reliability of the data collected (Saunders et al. 2003, P. 308).

According to Bell (1999) cited by (Saunders et al. 2003, P. 309), the pilot study should be used to find out:

- How long the questionnaire takes to complete;
- The clarity of instructions;
- Which, if any, questions were unclear or ambiguous;
- Which, if any, questions the respondents felt uneasy about answering;
- Whether in their opinion there were any major topic omissions;
- Whether the layout was clear and attractive; and
- Any other comments.

According to Hussey and Hussey (1997) and Sekaran (2003), pre-testing may involve friends, colleagues and people of different opinions. Moreover, it may involve a small number of respondents to test the appropriateness of the questions and their comprehension. Therefore, it was necessary to test and pilot the questions. The researcher then took into consideration the aforementioned suggestions and recommendations and concluded the following three stages as the best way of testing the questionnaire:

In the first stage, the first draft of the questionnaire was distributed to five colleagues undertaking their PhDs in various business related subjects within the Huddersfield University Business School. They provided many productive suggestions and comments relating to the wording of questions, design, sequence, questions content, clarity, and the ability to understand its contents. Most of their comments and suggestions were taken into consideration, and a few amendments were made to generate the second draft.

In the second stage, the questionnaire was handed to two members of academic staff at the University of Huddersfield Business School. Constructive comments and feedback were received from the academic staff and resulted in some minor changes to the wording and scales of some questions. In addition, the researcher's supervisor's comments were also taken into consideration, as his comments were very important in the constructing of the questionnaire. A copy of the questionnaire was e-mailed to two academic researchers in different universities, Manchester University and Bradford University, who are

interested in the field of backward linkages and transfer of technology. Useful feedback was received, including suggestions for changes to the wording and measurement of some questions; they were taken into consideration when generating a new draft. A draft questionnaire was also piloted by three Jordanian professors at the University of Jordan business school and Mutah University (leading government Universities in Jordan), all of them holding a PhD from British and American Universities, either in international business or management. Each of them received two versions of the questionnaire, one of them in Arabic and the second in English. They were asked to check the translation from English into Arabic and also to provide their feedback about the questionnaire in terms of design, words, contents, and measurement. Many useful suggestions and comments were received from them, and resulted in amendments to the wording and scale of the questions.

The final stage of pre-testing was carried out by distributing ten questionnaires to ten foreign companies randomly selected from the sample. The questionnaire targeted the purchasing managers in each company. The respondents were asked to complete the questionnaire and provide any comments about its contents and wording to decide if it was written in an understandable way. Six of the ten questionnaires personally distributed were returned completed. This constitutes a response rate of 60% of the total sample in the pilot study. None of the respondents proposed any comments, which indicated that the questionnaire was clear and easy to complete. Consequently, the final questionnaire was constructed after taking into account the suggestions and comments of the pre-testing stages included in the pilot work.

With respect to the comments received from the pre-testing and pilot stage, many modifications were made to the questionnaire, but without deleting important questions. In general, most of these modifications related to wording, layout and improvements in the clarity of the content, with exception of the comments received from the academics interested in the field of backward linkages and transfer of technology from Manchester University and Bradford University, which related to some contents of the questionnaire.

5.9 Features of the cover letter

According to Saunders et al. (2003), most self-administered questionnaires are accompanied by a cover letter to explain the purpose of the survey because it helps to increase the response rate. In this context, research by Dillman (2000) and others cited by Saunders et al. (2003, P. 305) has shown that the messages contained in a self-administered questionnaire's cover letter will affect the response rate.

According to Nachmias and Nachmias (1996, p.266), the cover letter should include the following:

1. Identify the person(s) or organisation(s) conducting the survey;
2. Clarify the purpose of research;
3. Explain the significance of the survey and
4. Assure the respondents that the data provided will be treated in strict confidence.

All of the suggested guidelines were adopted to establish a well-designed cover letter. Therefore, the cover letter enclosed with the final draft of the questionnaire (see Appendix C) was carefully designed to ensure the respondents understood the objectives of the study. The letter was printed on a single page of official, University of Huddersfield letter head paper. The first paragraph of the letter included the title of the research; the second paragraph provided information regarding the purpose of the study; the third paragraph illustrated the significance of the research to both foreign firms and local suppliers; the fourth paragraph reaffirmed the respondents that all the information would be used specifically for research and scientific purposes, and be treated as strictly confidential. The cover letter concluded with thanks to the recipients for their time and help.

5.10 Administering the questionnaire and response profile

The fieldwork began in Jordan from 20th of November 2006 to 15th of April 2007. The researcher started his field work by visiting officials informed about the regulations that govern the operations of foreign firms in Jordan. The main purpose of the visits was to obtain a better picture of the context of the study, to obtain more information about regulations that govern foreign firms operations, and to collect documents, reports, and

statistical records, and contact some of the information centres to see if any previous studies relating to the research topic had been carried out. In order to gain more information related to the investment system, which may not be obtainable from the investors, the researcher also interviewed some officials. In addition, the researcher also needed to interview these selected officials in order to obtain a more complete picture and to gain an insight into the backward linkages from their point of view, and thereby to provide some balance.

It was also important to speak to some officials who direct backward linkages, such as the manager of National Linkages Programme (NLP). Besides that, the researcher made other visits to the Jordanian Investment Board (JIB), which provides facilities and services to investors. These visits confirmed the importance of this research, not only because officials themselves emphasised the need for this kind of research, but because of the apparent shortage of studies of transfer of technology in general, and transfer by backward linkages in particular. Also, the information and data collected from this preliminary visit were useful in facilitating the fieldwork by providing the researcher with more information about foreign firms operating in Jordan.

As mentioned earlier, because the research population is small, the sample targeted almost the entire population. The decision was made to adopt individual distribution to administer the questionnaire. This method is recommended by authors as a good method of data collection (e.g. Oppenheim, 1992, Hussey and Hussey, 1997, Sekaran 2003). The rationale for the use of this method is its ability to assure a high response rate. In addition, this method has other advantages, such as low cost and little time consumed to collect the questionnaire. However, most of the research population is located in Qualified Industrial Zones, Industrial States, and Free Zones, which facilitated the task to personally administer the questionnaires. Therefore, the questionnaire was delivered and collected personally by the researcher. The researcher visited all the foreign firm's purchasing managers, or those who represent them, to encourage them to answer and return the questionnaires, and to ensure that the process was moving smoothly. As mentioned earlier, the postal service, email and internet are uncommon and unsuitable for

distributing and returning questionnaires in Jordan. To ensure confidentiality, the questionnaire was attached to an unmarked envelope for insertion upon completion. The return was made by reversing the distribution process.

The respondents were asked to indicate if they didn't have local suppliers, to complete one section from the questionnaire that was concerned with reasons for not having local suppliers, in addition to the first section of the questionnaire that was concerned with the type of business activity, number of employees, origin of the parent firm, and the year of its establishment.

Many authors have suggested numerous factors that need to be followed in order to enhance the response rate. According to Oppenheim (1992), the following recommendations have been found to increase the response rate:

- *Advance warning*: Informing the respondents of the study in advance;
- *Explanation of selection*: Explaining the method of sampling used;
- *Sponsorship*: Motivate the respondents;
- *Confidentiality*: Assuring respondents that all information will be totally treated confidentially; and
- *Incentives* to the respondents.

By taking the above suggestions and recommendations into account, the following efforts were made to increase the response rate:

1. A cover letter and supervisor's letter was attached to the questionnaires and the semi-structured interviews, explaining the research objectives. In addition, it emphasised the respondent's co-operation as the main contribution to the success of this study.
2. The questionnaire assured the respondents' anonymity.
3. The respondents were given an option to give estimates if they don't have the exact figures for some questions, such as percentage of exports and percentage of local sales.
4. Telephone calls and personal visits were conducted to remind the respondents to answer the questionnaire.

5. A well laid out questionnaire.
6. The respondents were given an option to receive a copy of the research findings and results.

The main survey consisted of 223 questionnaires. Each participant was delivered a cover letter, questionnaire and prepaid envelope. The process of distribution and return was also conducted carefully and confidentiality maintained.

The responding firms cover a wide range of manufacturing activities, including electronics, engineering products, electric, chemical and pharmaceutical. A total of 139 questionnaires were returned, 117 of which were completed and returned questionnaires, and twenty two questionnaires were returned uncompleted, with specific reasons for non-completion. For example, some firms stated they didn't have enough time to complete the questionnaire, while others stated that their company policy does not allow them respond to surveys. Out of 117 completed questionnaires, only four were unusable (half completed, missing answers, left parts...). Out of 113 usable questionnaires, 93 companies have local suppliers and completed the entire questionnaire, and a further twenty who have no local suppliers, completed only two sections from the questionnaire, the one that was concerned with reasons for not having local suppliers and the first section of the questionnaire that was concerned with type of activity of the business, number of employees and so on. The population, the responses and the breakdown of the sample can be seen in table 5.5.

Table 5.5 Population and response rate breakdown

<i>Population size (Manufacturing and assembly companies)</i>	<i>223</i>
Number of questionnaires delivered	223
Number of questionnaires returned	139
Number of completed questionnaires returned	117
Number of uncompleted questionnaires returned	22
Number of unreachable respondents	0
Unusable questionnaires	4
Usable questionnaires	113
Number of companies that have local suppliers	93
Number of companies that have not local suppliers	20
Response rate	62%
Usable response rate	51%

According to De Vaus (1990, p. 99), calculating the response rate can be executed by using the following formula:

Response rate = total number of response / total number in sample – (unreachable + ineligible). Applying this formula, the response rate = $139 / (223 + 0) = 62\%$.

In this context, the key reason that helped in obtaining such a high response rate was the aforementioned efforts made to increase the response rate and the personal way in which the questionnaire was distributed, which encouraged managers to fill it in.

After removing the uncompleted questionnaires, there was a total of 113 usable questionnaires returned, constituting approximately 51 % of the total population. This number was deemed to be adequate enough to carry out the data analysis because almost the entire population was targeted by this research. Thus, the response rate is considered to be satisfactory as it is equivalent to or higher than response rates in other backward linkages and transfer of technology studies (e.g. Giroud, 2003; Driffield and Noor, 1999). The firms that have no local suppliers will be analysed separately in order to find out the reasons for not having local suppliers. Finally, a total of 57 respondents were interested in

receiving a copy of the research findings. Therefore, a copy of the preliminary findings will be mailed to each respondent with a letter of thanks.

5.11 Conducting the interviews

A convenient time was arranged with the managers for the interviews. Some of the managers involved in this phase had already responded to the questionnaires. During pilot testing, it was learned that establishing a good relationship with the participants facilitated the fieldwork programme.

The participants had the right to choose the place where they wanted to be interviewed and whether they were willing to have their answers recorded during the interview. It was found that most of the participants did not want to have the interviews tape-recorded for several reasons. One of the managers mentioned she did not feel comfortable talking about the firm relationship with their suppliers and the difficulties she faced while the tape recorder was switched on; another manager said he had never been exposed to this kind of research before. The researcher's technique was to take hand-written notes during the interview and upon completion of the interview, recall the points made and write them down.

However, it was often necessary to keep the interview confined to the relevant topic, as the interviewees often wanted to chat more sociably. This became easier with increased interview practice. Apart from a few minor obstacles, such as one manager having to leave for an urgent meeting, it was generally felt that the research was going well. However, such problems were resolved because the researcher had built flexibility into his plans. The interviews took approximately 45 minutes to two hours. Although the managers did not have to take part, they were willing to do so.

Interview participants were secured by personal contact, which is the best approach to build and establish strong trust and good rapport with participants. The intention was to interview 20 purchasing managers. Thirteen purchasing managers agreed to take part in this study, seven of which declined because they were too busy, or because company

policies do not allow them to respond to interviews. The response rate of these interviews was 65%.

The field work was concluded successfully. This was probably due to several factors: good preparation and administration, useful advice from the researcher's supervisor, and most importantly, the efforts on the part of the purchasing managers of foreign firms.

Considerable effort was expended in the design of the questionnaires and interviews to ensure that there was no ambiguity. The results from each of these methods will be detailed in the next two chapters.

5.12 Validity and reliability evaluation

Validity and reliability measurements are the basic criteria for evaluating the accuracy and precision of quantitative aspects in this research. Validity refers to the degree to which an instrument measures what it is supposed or intended to measure, whereas reliability refers to how well the instrument of interest is measured (Oppenheim, 1992). Measurements must be valid; that is, they should be accurate and the findings should be about what they appear to be about. Measurement must also be reliable, or precise: the same answer should be obtained on re-measurement; the same results or observations should be obtained by different researchers on different occasions (Saunders et al., 2003).

5.12.1 Validity

Validity is an essential part of collecting research data. It refers to the extent to which the research findings accurately represent what is really happening in the situation (Hussey and Hussey, 1997, p. 57). A test is valid if it measures what the researcher thinks or claims it does (Coolican, 1992). In other words, validity refers to the extent to which a test measures what we actually mean to measure.

There are many research errors that could undermine the validity of the research, such as poor samples, faulty research procedures, and inaccurate or misleading measurement (Hussey and Hussey, 1997; Saunders et al. 2003). Therefore, in order to meet the validity criteria, the researcher should develop an accurate measurement tool to reflect a better understanding of the questions included in a measurement tool (e.g. questionnaire) which guarantees that all respondents are inclined to respond to all questions. In other words,

the instrument of measurement should be understandable for all respondents in order to ensure that the findings are really about what they appear to be about. However, according to Creswell (2003), validity can be classified into external validity and internal validity.

External validity

External validity is the researcher's ability to draw correct inferences from the sample to other persons, settings, and past or future situations (Creswell, 2003, p.171). The external validity of research findings refers to the data's ability to be generalised across persons, settings, and times (Cooper and Schindler, 2001). Adopting a representative sample is a basic consideration to achieve external validity. It can be concluded that external validity depends on selection of a representative sample. It is therefore difficult to generalise the findings unless the drawn sample is representative of the population. However, validity of a sample depends on two considerations: accuracy and precision. Accuracy is the degree to which bias is absent from the sample, whereas precision reflects the extent the characteristics of a sample are similar to that of the population. Precision is measured by the standard error of estimate; the smaller the standard error of estimate, the higher the precision of the sample (Cooper and Schindler, 2001, p. 165).

As mentioned in Section 6.4, the entire population was targeted as the sample for this research. Although not all the foreign manufacturing companies responded to this research, the response rate of 62% is a good indication that the sample is representative of the population. In addition, most of the variables included in the research model have a standard deviation with a value less than 1, as displayed in the descriptive statistics shown in Chapter 7. Thus, it is possible to generalise the findings of this study on the entire population. The external validity was indeed achieved and met through this study.

Internal validity

The internal validity is the ability of a research instrument to measure what it is supposed to measure. Internal validity is the researcher's ability to draw sound inferences from the

data in an experiment (Creswell, 2003, p.171). Internal validity is concerned with several types of validity, mainly including content and construct validity.

Content validity

Content validity ensures that the measurement scale includes an adequate and representative set of items that signify the concept (Sekaran, 2003). The more the scale items represent the domain or universe of the concept being measured, the greater the content validity (Sekaran, 2003, p. 206). Content validity can be determined by a careful definition of the research topic, and the items included in the measurement scale (Cooper and Schindler, 2001; Punch, 2005). A common way to assess this is to have someone examine the content and format of the instrument, and judge whether or not it is appropriate; someone who knows enough about what is to be measured to be a competent judge. In addition, a group of experts can comment and judge on the suitability of the questionnaire, as well as allowing suggestions to be made regarding the questionnaire's structure (Saunders et al., 2000, p. 306). Therefore, in order to meet content validity in this study, several efforts and procedures were undertaken. First, an extensive literature review was undertaken to define the purpose of the study and clarify the scales and measures used in this research. Second, most of the items and scales used in this research were adopted from several studies, which placed an emphasis on meeting the requirements of validity and reliability. Third, the questionnaire items were scrutinised and pre-tested by members of staff, doctoral students and a panel of academic experts in the UK and Jordan to judge the content validity of the questionnaire. Fourth, a pilot study was undertaken to ensure that respondents had no problems answering questions (see Sub-section 5.8.3). Therefore, the content validity of the questionnaire was met. Finally, the researcher distributed the questionnaires by himself (personally administered questionnaire; distributed and collected by the researcher himself). This was, to introduce the questionnaire and explain any misunderstanding about questions.

Construct validity

This type of validity refers to how well the results obtained from the measurement scale fit the theories around which the test is designed (Sekaran, 2003; Punch, 2005).

According to Alkhalidi (2003), construct validity can be attained through pre-trial procedures. As mentioned earlier, this study carried out a number of pre-testing stages and pilot work to enhance construct validity.

Semi-structured interview validity refers to the extent to which 'the researcher has gained full access to the knowledge and meanings of informants' (Easterby-Smith et al., 1991: p.41). Usually, the validity of in-depth and semi-structured interviews is very high; this refers to the flexible and responsive interactions which are possible between interviewer and respondents, allowing the meaning to be probed, the topic to be covered from a variety of angles, and questions made clear to respondents (Saunders et al. 2003). In this study, thirteen purchasing managers were interviewed and through good preparation for the interviews they were encouraged to give the researcher the required data. Also, there were many things which helped to encourage the interviewees to provide data: the researcher's ability to construct a good rapport or trust with the interviewees through personal visits to their offices; emphasising the confidentiality of the obtained data; properly introducing the study; providing the interviewees with a list of the probable questions to prepare answers for them; good strategies applied through conducting the interviews in terms of avoiding any kind of biases, taping the entire interviews where possible, and taking notes.

5.12.2 The reliability

Reliability is the second essential characteristic of data after validity. The reliability of a measure refers to the extent to which it is without bias (error free); and hence ensures consistent measurement across time and across the various items in the instrument (Sekaran, 2003, p. 203). The reliability of a measure is an indication of the stability and consistency of a measure over time (Easterby-Smith, 2002). However, reliability gives us an indication about the consistency of the instrument. It can be determined through various methods. Cronbach's Alpha measurement of internal consistency was adopted in this research to assess the overall reliability of the measurement scale; alpha gives an estimate of the proportion of the total variance that is not due to error and represents the reliability of the scale (Oppenheim, 1992, p.160). This measure is the most frequently

used method for calculating internal consistency (Saunders et al., 2000, p. 307). An acceptable level of reliability depends upon the aim of the research; the different researchers considered various alpha levels to be acceptable. For example, the recommended minimum acceptable level of reliability for Cronbach alpha is .60 using Hair et al.'s (1998) criterion, and greater than .50 using Nunnally's (1978) criterion. The reliability of the questionnaire was calculated using the Statistical Package for Social Sciences (SPSS). The results show that all the variables passed the test and the achieved values exceed the recommended value of this test.

Semi-structured interview reliability is concerned with whether alternative interviewers would reveal similar information. Punch (2005) asserts the issue of reliability is that the findings from using non-standardised research methods are not necessarily intended to be repeatable since they reflect reality at the time they were collected, in a situation that may be subject to change. The value of using this non-standardised approach is derived from flexibility that may be used to explore the complexity of the topic. Nevertheless, the concern about reliability in these types of interviews is also related to the issue of bias. In this study, the researcher tried to avoid interviewer bias resulting from the comments, tone or non-verbal behaviour to create bias in the way that interviewees respond to the questions being asked. In addition, he tried to avoid interviewee bias through improving his perception by building a good rapport or trust with them, a good introduction of the study, emphasising confidentiality, leaving the participants to talk in the manner they wanted, and asking permission to record the interviews.

5.13 Statistical methods used in data analysis

The purposes of this study can be classified as descriptive, and other aspects as hypotheses testing. The essential difference between these types of studies lies in their objectives (Cooper and Schindler, 2001). The main aim of descriptive studies is to describe the variables characteristics (Sekaran, 2003), whereas the objective of hypotheses testing is to explain the nature of certain relationships. One of the aims of this study is to ascertain the extent of transfer of technology from foreign firms to local suppliers, and which types of assistance foreign firms provided their local suppliers with.

Therefore, this part of the research can be classified as a descriptive study. On the other hand, the research aims to investigate the impact of several contingent variables on the extent of transfer of technology. This part of the research can then be classified as a hypotheses testing study.

The analysis and interpretation of any data depends on the objectives of the study and the nature of data (Hussey and Hussey, 1997). As mentioned earlier in this chapter, the decision was made to adopt the mixed approach to meet the objectives of the research and to test its model. It is widely recognised that determining the appropriate statistical methods to analyse data depend mainly on meeting the assumptions of parametric tests. According to Field (2000, p. 37-38), Bryman and Cramer (2001, p. 115), and Field (2005, p. 64), these assumptions are:

1. The scale of measurement is of equal interval or ratio scaling; that is, more than ordinal.
2. The data are from a normally distributed population.
3. The variances should not change systematically throughout the data.
4. The behaviour of one participant does not influence the behaviour of another.

To meet the objectives of the research and test its model, a decision was made to utilise a number of statistical methods in analysing the data. These methods are:

- Descriptive statistics: frequency and mean.
- Correlation and Multiple Regression.

A brief discussion of these methods, the justifications, and rationale for using the statistical techniques in analysing the data are given in the following sub-sections. Chapters 6-7 will provide more detailed explanations of some of the items in the following sub-sections.

5.13.1 Descriptive statistics

According to Hussey and Hussey (1997), descriptive statistical methods are concerned with describing, presenting and summarising data. Descriptive statistics can be defined as those methods involving the collection, presentation, and characterisation of a set of data

in order to describe the various features of that set of data properly (Berenson and Levine, 1999, p. 5). In addition, Levine and Fox (2003) define descriptive statistics as those techniques involving the collection, presentation and characterisation of a set of data in order to describe the basic features of the data in a study. Descriptive statistics, also called exploratory statistics, involve the transformation of raw data into a form that would provide information to describe a set of factors in a situation. This is accomplished through ordering and manipulating the raw data collected (Sekaran, 2003).

Frequencies and means were utilised earlier to describe the characteristics of the responding firms and the individual respondents. In addition, frequencies and means were used to achieve the explorative objectives of this research, as well as determine the sample characteristic, and to develop the primary feeling about the data distribution. Frequencies were used also to analyse and interpret the outputs of descriptive statistics analysis for each variable included in the research model. For example, frequencies are used in ranking the types of assistances provided to their local suppliers and also used in ranking the obstacles that foreign firms face when providing assistance to their local suppliers. Moreover, the means were also used to describe the types of assistance provided to their local suppliers according to some factors, such as the time they spent in Jordan. In addition, simple descriptive statistics in the form of means, standard deviations, frequencies, percentages, and rank, were used to display the questionnaire findings on background variables, such as age of the firm in Jordan, and size of the firm measured by the number of employees currently employed at the firm.

Moreover, descriptive statistics provide an indication about the shape of the sample distribution, which helps in deciding the appropriate analytical statistical method that should be used to test the research model when satisfying a set of statistical criteria and assumptions.

5.13.2 Correlation and Multiple Regression

Correlation and multiple regression are used because all of the research variables are measured on an ordinal and interval scale, and the dependent variable is also metric. A correlation is a measure of the linear relationship between variables. Correlation analysis

is used to describe the strength and direction of the relationship between two variables (Pallant, 2001). According to Field (2005, p.111), the correlation coefficient value has to lie between -1 and +1. A coefficient of +1 indicates the two variables are perfectly, positively correlated; so as when one variable increases, the other increases by a proportionate amount. Conversely, a coefficient of -1 indicates a perfect negative relationship: if one variable increases, the other decreases by a proportionate amount. A coefficient of 0 indicates no linear relationship at all; so if one variable changes, the other stays the same.

In order to judge the strength of the relationship between the variables, Bryman and Cramer (2001, p.174), citing from Cohen and Holliday (1982), suggest the following: a value between 0.19 and below is very low; 0.20 to 0.39 is low; 0.40 to 0.69 is modest; 0.70 to 0.89 is high; and 0.90 to 1 is very high. In contrast, Cohen (1988) suggested that a value of approximately 0.10 represents a small correlation, 0.30 a medium correlation and 0.50 or more represents a large correlation.

However, the correlation analysis shows that variables are related, but it does not determine which of these variables is the independent one and the dependent one. In this context, Field (2005) indicated that correlation is a very useful analysis technique but it does not provide information about the predictive power of the variables, while multiple regression complements the correlation analysis by identifying the dependent and independent variables. They are also appropriate for identifying the impact of independent variables on the dependent variable (Field, 2005).

Multiple regression is considered a sophisticated and well-developed modelling approach to data analysis, with more than 100 years of history (Nusair and Hua, 2010). Multiple regression can be utilised to analyse the relationship between a dependent variable and a set of independent variables (Hair et al., 1998). In this context, Field (2005) states that multiple regression analysis is a way of predicting some kind of outcome from several predictor variables. However, the main objective of utilising multiple regression analysis in this research is to use independent variables whose values are known to predict the

single dependent value. Each dependent variable is weighed by the equation of the multiple regression to ensure maximal prediction from independent variables (Hair et al., 1998). The weights denote the ability to quantify precisely the relative importance of each proposed variable. Thus, it is used to investigate the impact of a set of independent variables on a dependent variable.

Multiple regression provides an assessment of the degree and character of the relationship between a dependent variable and independent variables. The independent variables provide collective prediction of the dependent variable, and in addition, may be considered for their individual contribution to the variation and its prediction (Hair et al., 1998, p.161). In this context, multiple regression determines the relative importance of each independent variable. Moreover, multiple regression provides the magnitude and direction of each independent variable's relationship, whether positive or negative. However, it shows the nature of relationships between a dependent variable and independent variables in terms of linearity. Finally, it gives us an insight into the interrelationship between independent variables through a correlation matrix.

In multiple regression, the model takes the form of an equation that predicts the value of the outcome variable Y from a combination of predictor variables, each multiplied by its own respective coefficient, plus a residual term (Field, 2005, p. 157):

$$Y = B_0 + B_1X_1 + B_2X_2 + \dots + B_nX_n + \sum i$$

The Y is the outcome variable. The coefficients are referred to as B values which indicate the individual contribution of each predictor to the model. If we replace the B values into the equation, the model can be defined. In this context, Chapter 8 will provide more details of this study.

In this research, regression analysis was used to meet the main objective, which is to examine the impact of several independent factors, such as the age of foreign firms, market orientation on the extent of transfer of technology, and knowledge through the hypotheses developed in Chapter 5. Finally, it should be noted that these statistical

techniques have been frequently used in backward linkages and transfer of technology (e.g. Giroud, 2003).

To achieve the purpose of the study, the Statistical Package for the Social Sciences (SPSS) was used in analysing the closed question data for this study. The SPSS package is an integrated system of computer programs designed for the analysis of social science data. The system provides a unified and comprehensive package that enables the user to perform many different types of data analysis in a simple and convenient manner; it allows a great deal of flexibility in the format of data (Field, 2005). Many items in the questionnaire responses were given numerical values according to the researcher's coding notes to facilitate the processing of information by computer. The questionnaire coding was discussed with specialists from the University of Huddersfield, as well as from Mu'tah University.

5.13.3 Interviews analysis

For interviews with managers, the researcher began by giving each respondent a code initial to ensure the confidentiality of the study. The managers' answers were then transcribed and categorised according to the questions, using tables designed for this purpose.

Secondly, relevant questions were extracted and organised according to theme. A number of sheets of paper were taken, each headed to reflect a particular theme, and all relevant points raised by managers were entered on each sheet. For example, all the points relating to the obstacles faced with the local suppliers were brought together under this heading. Finally, this data became the source for a series of analytic memos, produced by cutting and moving excerpts from interviews to the relevant theme.

5.14 Summary

This chapter has discussed the research philosophy, design, and differences between research paradigms, as well as discussing methodologies.

Having considered various data collection methodologies, it was concluded that the most suitable approach involved two complementary methods. The first method was a quantitative approach and employed a questionnaire. Personal administration questionnaire method was employed as the most appropriate method to increase the response rate and to collect a large amount of data. Specific design methods were used in constructing the questionnaire. Several steps were employed for evaluating and testing the questionnaire, in addition to conducting pilot work. The second method was qualitative and employed interviews. The interviews were intended to garner in-depth data specifically relating to the relationship between foreign firms and their local suppliers. Managers were encouraged to speak freely and confidentially, and to disclose any obstacles or suggestions that they may have regarding their relationships with their local suppliers. Interviews were also conducted with some officials to provide more information about the regulations that govern foreign firm operations in Jordan. Interviews with some officials were employed in order to gain a better picture of the context of the study.

The research population was also discussed in this chapter, followed by a justification for selecting foreign manufacturing companies operating in various manufacturing sectors in Jordan as a population for this study. The issues of reliability and validity were also discussed. Finally, a description was provided of the statistical methods utilised in this research.

Chapter Six

Qualitative Data Findings and Analysis

6.1 Introduction

As indicated in chapter 5, the researcher conducted face-to-face, semi-structured interviews with 13 purchasing managers. The primary objective of these interviews was to gain a better understanding and in depth information regarding the questions relating to the research hypotheses and to enhance and enrich this research. However, the analysis of the interviews leads us to identify the types of knowledge transferred and the means by which they are transferred. The analysis of the interviews also assists to identify the extent of formation of backward linkages and the reasons for weak backward linkages. In other words, this aspect of the study assists in identifying the reasons behind importing the majority of the production input from abroad.

A descriptive analysis using frequency distribution is applied to present the findings from these interviews and, where suitable, some significant statements are quoted from the interviews to illustrate relevant points. In the methodology chapter the rationale for the chosen data collection methods was provided. It was justified that in order to achieve the objectives of this study, two data collection methods were to be used; namely, a questionnaire and a semi-structured interview. The justifications for interviewing purchasing managers were also provided in more detail, in the methodology chapter of the study.

The main aim of this chapter is to present and analyse the qualitative data produced from the semi-structured interviews. Thus, this chapter includes the following sections: Section 6.2 provides a profile of purchasing managers interviewed as well as their firms. Section 6.3 presents information about motivations of first investment in Jordan. Section 6.4 deals with the extent of backward linkages with local firms, and the reasons of importing some of the inputs from abroad. Section 6.5 describes the development of the relationship

between foreign firms and their local suppliers. Section 6.6 identifies the type of assistance provided to local suppliers and the means by which they are transferred. Section 6.7 concludes with a chapter summary.

6.2 Profile of Purchasing Managers Interviewed and their firms

Interview participants were secured by personal contact, which is the best approach to build and establish a strong trust and good rapport with participants. As mentioned in Section 5.6, the purchasing managers or those who represent them were targeted for this study because they have the required information to answer the research questions. The intention was to interview twenty purchasing managers, of whom 13 responded favourably. The response rate of these interviews was 65%. The other managers declined to take part in this study because they were too busy or because their firm's policies do not allow them to respond to surveys. Once the purposes of the study were explained, managers expressed genuine interest in the subject and were willing to take part in the study. The interviewed firms included two firms operating in garment industries, four firms operating in chemical, four operating in Engineering, and three operating in Electrical and electronic industries. With respect to the nationality of the managers, five purchasing managers were of Jordanian nationality and eight were of foreign nationality. Table 6.1 provides the key features of each of the interviewed firms.

6.3 Motivation for first investment in Jordan

The common motivations cited by interviewed managers were that their firms were mainly motivated to enter Jordan by the opportunities the location has offered them. Entry to the Jordanian market is predominantly motivated by efficiency seeking motives, driven by lower production costs and export opportunities combined with the closeness to other Arab country markets.

There are plenty of unskilled persons in Jordan who work for a monthly wage of around US \$200 (in 2006). The monthly wage average in Jordan is low compared to that of industrialised nations and many other developing countries. Three managers also cited the relative political stability of the country as a motive for their investment. Out of the

three firms, two Iraqi firms moved their operations to Jordan after the 1991 war between America and Iraq.

Table 6.1 key features of interviewed firms

Features of respondent Firms	Industry	Age	Location	Size	% of local Sales	% of foreign ownership
I1	Garment	5	QIZs	2225	0%	100%
I2	Garment	4	QIZs	1407	0%	100%
I3	chemical	13	Industrial Estates	316	10%	40%
I4	chemical	7	Industrial Estates	122	5%	49%
I5	chemical	9	Industrial Estates	84	60%	35%
I6	chemical	12	Outside of Industrial Estates and QIZs	421	70%	100%
I7	Engineering	6	Industrial Estates	57	20%	60%
I8	Engineering	10	Industrial Estates	115	12%	90%
I9	Engineering	3	Industrial Estates	42	7%	100%
I10	Engineering	5	Industrial Estates	25	80%	100%
I11	Electrical	5	Industrial Estates	135	35%	95%
I12	Electronic	9	Industrial Estates	87	22%	100%
I13	Electrical	8	Industrial Estates	117	10%	85%

With respect to the firms located in the QIZs, according to the two interviewed managers for two garment firms located in QIZs, the main motivation for their investment in Jordan is the opportunity the qualified industrial zones agreement offer them, through which approved goods produced in QIZs can be exported to the United States duty-free if the products contain 8% of the inputs from Israel, and QIZ factories must add at least 35 percent to the value of the products. For example, garment manufacturing can not be fully automated (Kelegama and Foley, 1999). Thus, the low wages in Jordan made it an attractive place for the industry. The QIZs allowed foreign firms to take advantage of domestic cheap labour, easily accessible high-quality raw materials, and intermediate goods produced abroad.

6.4 Extent of backward linkages with local firms

As pointed out in chapter 2, the creation of backward linkages with domestic suppliers can benefit both foreign firms and local firms because backward linkages allow foreign firms to increase their specialisation and flexibility as well as adapt their production to

the requirements of the local market (UNCTAD, 2001). The advantages of backward linkages to the local economy are not limited to generating more employment and foreign exchange; rather, backward linkages motivate local firms to improve the quality of their products, especially if provided with assistance by their buyers (UNCTAD, 2001).

One of the main benefits which could be gained by foreign firms from having local sources of input, would be reduced lead-time, avoid delays, and increased control over managing the delivery of inputs. In this context, Porter (1990) argued that the creation of backward linkages with local firms lead to reducing the lead-time, which is the duration of time between when an order is placed and a delivery made. However, in recent years, buyers have pressured suppliers to reduce the lead-time because the speed of delivery is important in determining the competitiveness of a firm (Kelegama and Foley, 1999). Therefore, competitive local suppliers are able to deliver inputs in an efficient, early, and rapid way. Further, a manufacturer could obtain inputs in instalments. In such a case, the manufacturers do not need to wait for the entire order to be produced by the supplier and arrive in Jordan. The manufacturer can obtain inputs in instalments and begin work quickly. In this context, the following statements are quoted from three purchasing managers, mainly from the electrical, engineering, and garment industries.

One of the purchasing managers stated that:

We prefer local suppliers, especially in regards to the currently frequent changes in the market, and change in customer demand. This requires us to quickly modify their products or services to remain competitive in the market.

The second manager stated that:

One of the advantages of having local suppliers is that they help us to deal with them closely. This allows us to co-operate with and assist them with any issue related to improvements of production or in making some adjustments when needed.

The third manager stated:

When we make an order for the fabric from China, if there is any mistake in the order it takes one month or more to correct and receive it again. But if this occurs with local suppliers, it may take one day or just hours to correct.

Obviously, the above statements indicate that most of the managers prefer local suppliers. In the case of importing the inputs from abroad, the firms were unable to check inputs until they received them in Jordan. If the inputs have not met their requirements, they have to reject the shipment and this causes financial loss. However, this problem could be avoided if local suppliers existed and the buyer firm repeatedly checked samples of inputs. A relationship with strong local suppliers would also allow firms to know when an input will be supplied to them. This enables firms to control inventories and supplies, and as a result allows the firms to employ 'Just-in-time' production techniques and simplify their own operations. Further, the manufacturer firms do not need to wait for entire orders to be produced and delivered to Jordan. On the other hand, manufacturer firms obtain inputs in installments and begin work quickly as long they can check the order and correct any mistakes in spite of the low percentage of the sourced inputs locally. All the interviewed managers stated that they have relationships with some local suppliers for some of the inputs that are relatively easy to produce and expensive to import due to high freight costs such as in relation to padding and corrugated cartons.

Overall, it has been found that locally sourced materials and components vary from firm to firm and from sector to sector. It has been found also that locally sourced materials and components are very few, especially for the garment industries. The firms that reported they procure some of the production's input locally also reported that most of the materials and components were imported from abroad. This statement, however, led the discussion to the current reasons of importing high percentage of the materials and components from abroad.

Eleven out of thirteen of the interviewed firms reported that the main reason for relying on imported materials and components was due to the fact that particular materials and

components are not available locally at all; in particular, the specialised inputs, while seven managers cited that the available inputs are not available in sufficient quality.

Since the specialised inputs are unavailable in Jordan, foreign firms purchase only basic inputs locally. They then have to purchase these inputs from different countries where these inputs are available in good quality and at a reasonable price. However, as pointed out by Javorcik (2008), in such situations there is little scope for knowledge transfer, and upstream sector benefits may be limited to increasing demand for inputs and allowing upstream producers to benefit from economies of scale. The benefits of economies of scale may be passed on to local input users in other industrial sectors and consequently benefit the whole host economy.

Five of the interviewed managers claimed that decisions concerning where to buy particular inputs come from the headquarters and their role is only to determine the amount needed. Three of the interviewees stated they also have other components or supply needs which are more firm specific and sourced from other suppliers within their international supply chains.

Table 6.2 summarises the foreign firms concerns about the local supply base. Nine firms were concerned about the lack of available local suppliers for various essential inputs, and seven judged the quality levels of inputs produced by local firms as inadequate. Five firms cited the implementing decisions of the parent firm.

It has been pointed out in chapter 2 that due to the changing in strategies of MNCs, there is less room for local suppliers to provide inputs to foreign industry. In other words, the demand for domestic inputs is restricted due to the role of international suppliers and follow-up suppliers. In this context, three firms cited that they use the company's global suppliers and only one manager cited that their suppliers established a plant in Jordan to supply them with the needed parts and components. Finally, four firms stated that they have the desire to purchase higher quality inputs.

Table 6.2 Reasons for importing inputs from abroad

<i>Reasons of importing inputs from abroad</i>	<i>Number of firms citing this reason</i>	<i>Percentage</i>
Unavailability of particular products from local firms.	11	85%
Unavailability of high quality inputs.	7	54%
Implement decision of parent company.	5	38%
Using company's global suppliers.	3	23%
Desire to purchase higher-quality inputs.	4	31%

The interviewees from the garment industry cited that there are very few local suppliers of fabrics and accessories needed as inputs for garment manufacturing, and on average over 70% of material inputs (excluding labour) needed in the industry are imported. The interviews show that most foreign firms import a very high percentage of the fabric, buttons, zippers, studs, eyelets, buckles and the interlining that they use.

This percentage indicates the lack of backward linkages from the garment industry. Most of the foreign firms already create business relationships with international suppliers of fabrics manufacturers. This also indicates that the domestic value added to this industry is low. Most of the fabric and accessories made in Jordan are basic and of low quality. Therefore, fine fabric and complex accessories are mainly imported from China and other countries. In this context, one of the interviewed managers stated:

There are only a few producers of fabric, only two label manufacturers, and only a few producers of other accessories of low quality.

It has been cited also that the manufacturers of these inputs enjoy economies of scale and a cheap labour force. As a result, this leads to a low cost of the unit of manufacturing. Therefore, as one of the purchasing managers stated:

In order to meet the regulations of QIZs, we purchase some inputs from Jordan and Israel in spite of the high cost of these inputs. For example, the cost of some kind of

thread is almost one dollar if we buy it from Israel, while it costs the company ten cents from China.

One can argue that despite the rapid growth of the garment industry in Jordan, significant suppliers of inputs to this industry have not developed yet. Backward linkages are valuable and important for host country development, but it depends on the host country's level of industrial development. This evidence reveals that most of the inputs of this industry were imported from abroad. One can also argue that while the open economy of Jordan and the USA-Jordan agreement has contributed to success in garment manufacturing, it currently lacks the conditions necessary to support local suppliers of fabric and some garment accessories. However, since the formation of linkages in an open economy is time dependent, it is expected that the formation of backward linkages will increase over time. This due to the fact that MNCs gain experience about the local business environment over time (Giroud, 2003). Furthermore, the time is important to both MNCs and local suppliers, MNCs need time to identify the appropriate suppliers and local suppliers need time to adapt themselves to meet the MNCs' needs and specifications.

The weak backward linkages indicate that local input industries did not develop the skills and capabilities to produce internationally competitive components and parts and continued to focus on the local market. This could be attributed to the fact that capital costs are high in Jordan. Thus, local firms are unable to start on large investments such as high-technological parts, components, and fabric in the case of garment industries on their own. Therefore, for most local firms, Jordan offers relatively cheap labour relative to capital, and domestic firms have cost advantages in producing labour-intensive goods and cost disadvantages in producing capital-intensive goods.

Ten out of thirteen (77%) of the interviewed firms anticipated an increase in local sourcing in the future. Three firms indicated that local sourcing in the future depends on the presence of new local firms for the currently unavailable components and the upgrading of the existing ones.

6.4.1 Development of the relationship with local suppliers

There was almost agreement as cited amongst the interviewees about the starting point of the relationship. When the firms identify the future suppliers they provide the potential suppliers with the requirements regarding the standards of the quality, the quantity needed and the specifications of the product. Audit is the second stage and is performed by the foreign firms to make sure that their standards have been met; otherwise, they provide the future suppliers with feedback about the deficiencies of which they had not been aware. If the quality of the potential supplier's product is inadequate, they try to make some improvements to their product in the light of the feedback they received from their future client. Once the improvement made by the potential supplier, the audit is performed by the foreign firms again. The process of auditing in some cases occurs several times until the standards of the client are met as a precondition for starting a dialogue with a potential local supplier. When the standards are met, the client signs a contract with a local supplier.

The interviewees cited that in the case where more than one potential customer is available, they usually evaluate the potential suppliers and then they choose the best based upon who met their requirements. In this context, one of the purchasing managers stated that:

We evaluate the available suppliers, and then we award contracts to the best available local suppliers.

As a result to the frequent contact and experience with each other, the relationship develops gradually. Greater trust is established, communication becomes easier, and the cognitive gap diminishes. As a result, the firms intensify our relationship with the supplier.

6.4.2 Satisfaction with Current local suppliers

One of the objectives of the interviews were to discover how purchasing managers view and evaluate their relationship with their local suppliers; in other words, to obtain in depth information, and to hear and learn from their views regarding other important points with their suppliers. Thus, the interviews aimed to explore how purchasing managers evaluate their relationship with their suppliers, what they think about it, whether they think that their local suppliers performance is satisfactory or not, what the problems are, and the challenges that face them with their suppliers.

The starting point for the discussion during the semi-structured interviews was to understand whether or not purchasing managers were satisfied or otherwise with their current local suppliers. Purchasing managers' satisfaction and dissatisfaction was explored by asking them a question about how they evaluate the performance of their local suppliers.

Purchasing managers' answers revealed many other new important themes and issues relating to their relationship with their local suppliers. Some of the interviewed purchasing managers were satisfied to some extent with their local suppliers' performance. Nine purchasing managers (69%) were satisfied with the performance of their local suppliers, mainly from firms operating in the chemical and engineering sectors, while four purchasing managers (31%) were dissatisfied to some extent mainly from electrical and garment industries. The reasons for not being satisfied were because they expect more from their local supplier. Their ambition is to reach the satisfied quality and the suitable cost which is comparative to their previous international suppliers.

The reasons for dissatisfaction with their local suppliers' performance led the discussion to the current problems and challenges they face with their suppliers which are now summarised below.

6.4.3 Current Problems with local suppliers

Purchasing managers were asked open-ended questions as well as closed questions regarding the current problems and challenges from their viewpoints. The results from the closed questions are integrated with the results of the open-ended questions.

However, from the results shown in Tables 6.2 and along with purchasing managers' answers of some particular open-ended questions, it seems that foreign firms are confronted by many problems that can be categorised in the following way.

A. Problems Associated with quality

The majority of the interviewed managers who are not satisfied with their current suppliers cited the poor quality of product as the main problem, and they do not observe any change in the supplier's performance. Some purchasing managers believed that some of their suppliers were not aware of the importance of improving their quality, or they were not convinced of the importance of the continuous improvement for the firm's success. One interviewer stated:

We actually spend money and efforts on improving our suppliers every year. We offer all facilities needed for improvements, but it seems that these efforts do not work very well.

The interviews also show that these problems reduced over time. In this context, one manager described their own experiences with some local suppliers by saying:

At the beginning of our relationship there were many problems concerning the quality of their product, but gradually these problems were solved.

B. Problems related to the training

The key problems associated with the training provided to local suppliers that were emphasised by the two managers were that their suppliers experienced low employees motivation for training. Another problem cited was also by one of the interviewed managers for garment industry, since there is a lack of training institutions that are

needed to prepare skilled workers, and what's available is also too small to meet the growing demand of the garment industry.

C. Problems related to the cost of products

One of the major problems cited by the garment firm's manager is that local suppliers are not competitive in terms of the price of their products; they basically focus on the domestic market and do not enjoy the large quantity of production.

However, this may reflect the economies-of-scale factor. Local firms do not enjoy the economies-of-scale factor. Further, this may also be attributed to the fact that Jordan does not produce the raw materials used in the production of fabric, such as cotton and other raw materials required to make synthetic fibers. Furthermore, even the materials required to produce certain accessories (buttons, buckles, zippers), such as plastics and metals, are unavailable in Jordan. As a result, the lack of required material to produce fabric and accessories causes them to face cost disadvantages relative to other international suppliers such as India, Egypt, and China. Consequently, the size of local firms is not yet able to supply the large size of the export-oriented garments manufacturing industry in Jordan.

D. Problems related to local workers

With regards to firms that employed foreign workers in their production, a difficulty in obtaining adequately skilled workers was the main reason given for firms resorting to employing foreign workers. Foreign firms also cited the problem of high labour turnover. Two managers from the garment industry pointed out that the difficulty in obtaining adequately skilled workers and the high labour turnover were among problems they confront.

6.5 Type of assistance provided to local suppliers

Crone and Roper (2001) argued that knowledge transfers by foreign MNEs are only likely to take place when foreign firms perceive that there will be some benefits to them, such as reducing the lead-times, improving quality, reducing costs, and improved

services. This has been confirmed by the interviewed managers by pointing out that they provide some of their local suppliers with several types of assistance in order to help them to improve their performance and enhance the quality of the products. In this context, one manager cited:

We provide our suppliers with several types of assistance; the main purpose is to help them to increase input quality and to reduce input costs. If these assistances are not fully reflected in lower prices and improve the quality, it is a waste of time and money.

The interviewees had been asked open-ended questions as well as closed questions about the types of assistance provided to their suppliers and the means by which these assistances are provided. It has been found that the most frequently occurring form of assistance appears to be associated with the specifications of the product, followed by technical training. All the interviewed managers (100%) reported that their firms provide their suppliers with specifications of product that need to be supplied, while eight managers (62%) cited that they provide their suppliers with training.

Provision of machinery, provision of inputs and financial assistances were cited as well by four managers. Two managers (15%) declared that they provided their suppliers with new machines in order to help them to increase the quality and production volume , but one of the two managers confirmed that the cost of these machines will be deducted in the future from the payments that will be paid to the suppliers for their products. This means that the provision of these machines is not free but it took the form of financial assistance or a free interest loan.

The chance of receiving a contract from foreign firms also seems to encourage local suppliers to undertake improvements on their own (Javorcik, 2008). However, some of the foreign firms' managers reported that they required the potential suppliers to make certain improvements to their output which used as input for foreign firms. As reported by the interviewed managers, these improvements take several forms, including

improvements to the quality of product, reducing the share of defective units, purchase new machineries and equipments to assure the quality, and increasing production volume.

Nine purchasing managers out of thirteen (69 per cent) reported that their firms require certain standards of the potential suppliers for product quality and on-time delivery. Six of the nine managers stated that they provide the potential suppliers with some assistance even before they become as a supplier to their firm, the purpose of this assistance, as they stated, being to assist the potential suppliers to make improvements and consequently meet their requirements. One of the managers stated:

One of the potential suppliers made investment on new machinery and sent some of their engineers for training to Germany in order to make improvements in the quality and increase the quantity of production. Later they became one of our main local suppliers.

One of the interesting findings is that we found one case in which foreign affiliates established its plant close to its main supplier in Jordan and benefited from their local partner' knowledge concerning the process of operation the conditions of the local market.

6.5.1 Training provided to suppliers

It was found that 62% of the foreign firms providing their suppliers with training. The most common types of training provided by foreign firms was training on the new machines and new technology. According to the interviewed purchasing managers, this type of training is needed especially when the new machines were provided to the suppliers. The following statements are quoted from three purchasing managers from the chemical, engineering, and electrical industries.

Based on the needs of our suppliers, we usually send our technical engineers to provide our suppliers with the necessary training.

Seven out of thirteen stated that they conducted visits to some of their supplier's plant. These visits conducted by the firms' technical staff in order to provide some training and to provide blueprints and information on the production techniques. Five of the managers (38%) responses to a question exploring whether they provide all suppliers with training or only to some of them, pointed that the training provided to certain suppliers. In this regard one of the managers declared:

The cost of some type of training is very high and we do not have enough time and resources to train all of our suppliers; thus, we train suppliers of specialised inputs. Therefore, I think training must be targeted to those who really need it.

This statement indicates that the training is often provided to suppliers that produce specialised inputs not for those who produce simple products. Consequently, there is little scope for knowledge transfer to those who produce simple products.

6.6 Summary

The profile of purchasing managers interviewed and their firms were presented in this chapter. The motivation for first investment in Jordan was presented as well. The analysis of the interviews show that in some situations in which upstream sectors in Jordan is underdeveloped, foreign firms rely on imports of its inputs from other countries, particularly in the case of very specialised inputs. These situations, however, limited the scope for transfer to upstream sectors.

Overall, it has been found that a backward linkage with domestic firms which may lead to intensive knowledge interaction is weak. The firms indicated several reasons for importing some of their inputs from abroad. These were unavailability of particular products, unavailability of high quality inputs, using company's global suppliers, a desire to purchase higher quality inputs, and implementing the decisions of the parent company, for example. This chapter also shows the current problems that foreign firms face with their local suppliers which relate to the quality of the product, the cost of the product,

local workers, and in some instances also related to the motivation of local supplier's employees.

The interviews with purchasing managers of foreign firms in Jordan show that foreign firms had high requirements concerning the quality of the products and on-time delivery. They also show that these firms assist some of their suppliers to upgrade their production process through different types of assistance and by training their suppliers.

Chapter Seven

Quantitative Analysis

7.1 Introduction

In the research methods chapter, it was pointed out that correlations and multiple regression will be performed to investigate the anticipated relationships between various contingent variables and the extent of technology transfer. The quantitative approach involves correlations and multiple regression being applied to test the research hypotheses stemming from the theoretical model.

The major aim of this chapter is to present and discuss the descriptive and statistical results relating to the research hypotheses.

This chapter covers the following sections: Section 7.2 provides descriptive statistics for the research variables. The normal distributions of the variables were checked by using skewness and kurtosis. Section 7.3 presents descriptive statistics concerning the extent of local backward linkages in the four industrial sectors. The factors deterring firms from creating backward linkages are presented in this section as well. Section 7.4 deals with descriptive statistics in relation to the independent variables and the extent of technology transfer. Section 7.5 deals with descriptive statistics in relation to the training provided by foreign firms to their local suppliers. Section 7.6 provides the validity of multiple regression analysis as a goodness fit model in relation to the research hypotheses. How missing data were dealt with is also provided in this chapter. Section 7.7 presents and discusses the findings relating to the hypotheses tests of the relationships between the contingent variables and the extent of technology transfer. Correlations and multiple regression were conducted to investigate these relationships. Finally, section 7.8 provides the chapter summary.

7.2 Descriptive statistics for research variables

In the research model, eight hypotheses were formulated to examine the impact of different independent variables on the dependent variable, i.e. the extent of the transfer of

technology (see chapter 4 for more details). Table 7.1 presents the descriptive statistics for the research variables relating to these eight research hypotheses.

The table includes the mean as measure of central tendency, standard deviation as measure of spread of distribution, minimum and maximum values, and skewness¹ and kurtosis² values to check for normality³ of each variable. According to Hair et al. (2003, p. 244), skewness values within the range of -1 to +1 and kurtosis values within -3 to +3 indicate an acceptable range for normality, whereas values falling outside the range of skewness and kurtosis indicate a substantial departure from a normal distribution. Thus, Table 7.1 shows that skewness and kurtosis values for all variables fall within the acceptable range.

Table 7.1: Descriptive statistics for research variables (N = 93)

Research variables	Mean	Std. Dev	Min	Max	Skewness	Kurtosis
Size	214.20	169.151	18	795	.975	.620
Ownership	.46	.501	0	1	.153	-2.020
Distance	54.35	31.452	0	100	-.185	-1.271
Age	7.69	3.704	2	17	.398	-.648
Autonomy	—	—	1.00	4.00	-.248	-1.560
Country of origin	—	—	0	1	-.471	-1.818
Local sales	40.05	33.253	0	100	.431	-1.128
Types of Industry	—	—	1	4	.022	-1.305

Note: the size of the firm was measured by the number of employees, the ownership was measured by the percentage of foreign ownership, the distance was measured by the km, the age of the firm was measured by the year spent in Jordan, local sales was measured by the percentage of local sale. While the autonomy, country of origin, and types of industry are dummy variables.

¹ Skewness is a measure of symmetry of a distribution. A positively skewed distribution has relatively few large values and tails off to the right, and a negatively skewed distribution has relatively few small values and tails off to the left (Hair et al., 1998, p. 38).

² Kurtosis is a measure of the peakness or flatness of a distribution when compared with a normal distribution. A positive value indicates a relatively peaked distribution, and a negative value indicates a relatively flat distribution (Hair et al., 1998, p. 37).

³ Normality refers to the degree to which the distribution of the sample data corresponds to a normal distribution. Where normal distribution is a theoretical probability distribution in which the horizontal axis represents possible values of a variable and the vertical axis represents the probability of those values occurring. The scores on the variable are clustered around the mean in a symmetrical, unimodal pattern known as the bell-shaped or normal curve (Hair et al., 1998, p. 38).

7.3 Extent of Local Backward Linkages in the four industrial sectors

Linkages with local firms are increasingly considered as one of the more important aims when host developing countries seek to attract FDI from MNCs. Such linkages obviously benefit both domestic and foreign firms (see Chapter 2 Section 2.8.3 for more details). In order for such a relationship to be sustained in the long term, it must provide positive consequences for the MNCs involved.

Linkages with local firms can be measured by several variables: the percentage of local suppliers input in foreign firms output, the number of local suppliers, and agreements with local firms (Driffield and Mohd Noor, 1999). In this research, local backward linkages were measured by both the number of local suppliers and also as a percentage of total raw materials and components sourced from suppliers based in Jordan. These measures are commonly used in the literature and are similar to the measures used by, for example, Driffield and Noor (1999); Turok (1993); and O'Farrell and O'Loughlin (1981). Such a measure allows us to examine whether inputs are sourced locally or from other countries, but does not allow us to determine whether the local supplies are purchased from indigenous or foreign-owned suppliers based in Jordan.

Table 7.2 provides the descriptive statistics of input supplied and the number of local firms acting as suppliers to foreign firms. As shown in table 7.2, the average percentage of total raw materials and components sourced from suppliers based in Jordan are 20, 65, and 39 for firms operating in garment, chemical, and electrical and engineering respectively. In terms of the average number of local firms acting as suppliers to foreign firms, these are 6, 23, and 15 for firms operating in garment, chemical, and electrical and engineering respectively.

Table 7.2 Local firms as suppliers to foreign firms

<i>Local firms as suppliers to foreign firms</i>						
	Garment		Chemical		Electrical and Engineering	
Number of local firms as suppliers to foreign firms	Mean	SD	Mean	SD	Mean	SD
	6	3	23	11	15	9
Percentage of total raw materials and components sourced from suppliers based in Jordan	20	11	65	21	39	18

Source: Question no. D2 and D3 of the questionnaire N =93

What is interesting, however, is that the firms operating in the chemical sector established more linkages with local firms, while firms from the garment industries established fewer linkages with local firms. This could be attributed to the regulation of the QIZs which facilitate and encourage the import of raw material and component from outside the country. The regulations of the QIZs enable industries located in these zones to enjoy duty-free import of raw materials, component parts, machinery and other equipment required directly in the manufacturing process. By taking the age of garment firms into consideration, this could also be as a result of the short period of doing business in Jordan; firms need time to develop their relationships with their local suppliers. While in the case of electronics and engineering, and chemical industries, these firms have a longer presence in Jordan than garment industries; therefore, these firms have more experience in the host country and may already have developed their relationships with the local firms. Moreover, most of these firms are located in the industrial states or outside, so the regulations that govern their activities vary.

Overall, foreign firms in the sample engage in low levels of local sourcing of total raw materials and components sourced from suppliers based in Jordan. More importantly, however, there is some evidence of knowledge transfer from foreign firms to their local suppliers, as will be seen later in this chapter.

7.3.1 Factors deterring firms from creating backward linkages

Lack of potential local suppliers that match the MNCs capability and quality requirement were the main reason firms did not create backward linkages, this reason cited by 16 firms (see Table 7.3). However, this reflected the weak backward linkages with local firms, and was partly due to the perceived low technological capability of local firms. As seen in Table 7.3 the second reason is the availability of materials and components abroad in competitive quality and cost. This reason is cited by 15 firms (75%). Other factors such as relatively small production were also cited as a reason for not creating backward linkages. However, the findings from this sub-section indicate that creating backward linkages required both availability of components and materials in large quantity as well as good quality and reasonable prices. This was evident in that sixteen

firms out of twenty (80%) of firms without local suppliers attributed this to the lack of potential partners that match MNCs capability and quality requirements.

Table 7.3 Obstacles for Forging Long-term Linkages

	Obstacles	Frequency	Mean
1	Lack of interest by MNCs	2	1.5
2	Lack of interest by local firms	12	2.58
3	Lack of information on prospective partners	10	2.8
4	Lack of potential partners that match MNCs capability and quality requirements	16	4.06
5	Lack of financial, technological and training institutions support	7	1.43
6	No capable local supplier	9	2.88
7	All inputs supplied by parent firm	7	1.57
8	Local firms unable to supply large quantity	13	4.0
9	Parent firm's policy	5	1.4
10	Local firms are too expensive	11	3.27
11	Foreign suppliers are more competitive than local suppliers	15	3.33

Source: Question no. D5 of the questionnaire N =20

These findings confirmed the findings of the interviews (see Chapter Six) in which some of the interviewees reported that procuring local materials and components provides opportunities and benefits to their firms rather than supplying them from abroad; but this depends on the availability of these components and as well as quality and cost.

Since the lack of potential local suppliers that match the MNCs capability and quality requirement was the main reason firms did not create backward linkages, one can conclude from this sub-section that government policies that promote local firms' development could be a good policy for creating backward linkages with foreign firms.

7.3.2 Evaluation of local firms as suppliers

Table 7.4 provides the descriptive statistics in foreign firms' evaluation of their local suppliers. Table 7.4 shows that the cost of purchases and on-time delivery ranked high in foreign firms' evaluation of their local suppliers, while quality of product and technical competence ranked the lowest in MNCs' evaluation of their local suppliers.

Table 7.4 Evaluation of local suppliers

Criteria		Mean
1	Quality of product	1.98
2	Cost of purchases	3.82
3	Regularity	3.47
4	Delivery time	3.73
5	Rejection rate	3.26
6	Flexibility to new order	2.61
7	Technical competence	2.12
8	Capacity to modernise and improve technical capabilities and quality level	2.16
9	Financial stability of supplier	2.90

Source: Question no. D4 of the questionnaire N =93

7.3.3 Motivational factors for firms' first investment in Jordan

Low labour cost, favourable government policies towards FDI, and favourable trade agreements were the main factors cited by firms as to why they invested in Jordan. Large domestic market and presence of competitors were ranked lowest in this part of the survey. The findings suggested that low labour cost, favourable government policies towards FDI, and favourable trade agreements were important in the firm's consideration of deciding whether to set up production or not.

7.4 Descriptive statistics for transfer of technology

One of the main aims of this research is to investigate to what extent knowledge exchange between foreign affiliates and their local suppliers take place. Thus, this section presents the preliminary findings relating to the transfer of technology from foreign firms operating in the Jordanian industrial sectors to their local suppliers.

Technological and other type of assistance were used in this study as indicators of a firm's transfer of technology. As noted earlier in Chapter 2, technology is not only embedded in machines and equipment but it is also something intangible; it includes managerial skills, marketing skills, technical skills and know-how. Therefore, this section discusses four indicators of technology transfer represented by several assistances provided to local firms as supplies: namely, technical assistances, whether related to product or process, training, and management and marketing. The former two have been used in earlier studies, while assistances related to management and marketing have

received less attention; thus, it is introduced in this study as an indicator of technology transfer. These assistances provide an indication of the transfer of technology to local firms. Identifying the various assistances provides important insights into the firms' technological transfer. Firms that provided their local suppliers with these assistances can be regarded as firms that contribute to the development of local firms more than do other firms.

Table 7.5 presents the descriptive statistics for the types of technology transfer. It shows that there are not any firms who provided their suppliers with all the types of assistances. The majority of them provide very limited assistances, and most of this assistance is related to the product and process of manufacturing.

Overall, as table 7.5 shows, forty seven out of ninety three (50.5%) of foreign firms provide suppliers with specifications about standard material and components. This type of assistance was the major one provided. This was followed by physical or technological specifications of the inputs purchased and technical training in the technology used. Forty three out of ninety three (46.2%) of foreign firms provide suppliers with physical or technological specifications of the inputs purchased. MNCs assistance through product specification, for example, provides excellent opportunities to local firms' technological development. Similarly, product design and personnel training also give local firms access to the technical know-how of MNCs.

With respect to training local suppliers, thirty seven out of ninety three (39.7%) of foreign firms provide their suppliers with technical training in the technology used. As shown in table 7.5, firms offer training in relation to machines and equipment, and technical training in the technology more frequently than professional training for the suppliers' managers. This may reflect the importance of this type of training to the production operation, and could be attributed to the fact that foreign firms basically like to ensure their suppliers are able to produce the parts and components according to their requirements. Chapter six revealed that this type of training is more important, especially when a new product, process or new machinery is introduced.

Table 7.5 Percentage of ¹MNCs with frequent knowledge transfer to their local suppliers

<i>Type of transfer</i>	<i>Garment</i>	<i>Chemical</i>	<i>Engineering</i>	<i>Electrical</i>	<i>Overall</i>	<i>Percentage</i>
	F	F	F	F	F	%
<u>Product and process</u>						
Specifications about standard material	5	13	16	13	47	50.5%
Technological specifications	5	7	13	18	43	46.2%
Method of manufacturing	1	5	5	7	18	19.3%
Product specifications prepared jointly	0	6	6	6	18	19.3%
Product design	1	5	11	8	25	26.8%
Assistance in factory layout, organisation	1	1	1	1	4	4.3%
Assistance in establishing production plant	0	0	0	0	0	0%
Supplying machinery, tools, materials	0	2	6	1	9	9.6%
Assistance in obtaining capital equipment	0	4	3	0	7	7.5%
Maintenance of machinery	0	2	4	1	7	7.5%
Regular feedback	5	11	0	12	28	30.1%
Assistance in technical management	0	1	2	2	5	5.3%
<u>Management and Marketing Assistances</u>						
Advice on managerial and organisation issues	2	4	2	2	10	10.7%
Advice on a whole range of financial and accounting	0	0	0	0	0	0%
Assistance with inventory management issues	2	3	2	2	9	9.6%
Assistance with quality assurance systems	3	6	4	3	16	17.2%
Provides information on market characteristics	1	6	7	8	22	23.6%
Assistance in the search for new customers	2	3	7	5	17	18.2%
Information on future demand requirements	2	6	8	5	21	22.5%
<u>Training Assistances</u>	-	-	-	-	-	
Professional training for the supplier manager	4	4	7	6	21	22.5%
Operational training to machines and equipment	4	8	13	10	35	37.6%
Technical training on the technology used	4	10	13	10	37	39.7%

Note: F refer to the frequency of firms reporting that they transfer each type of knowledge ‘frequently’ or ‘always’. While the percentage here refer to the total of frequencies for each type of transfer divided by the number of firms (93 firms).

¹ The number of MNCs that participated in this study was: 17, 31, 26, and 19 for the Garment, Chemical, Engineering, and Electric and Electronic respectively.

The findings of this section confirmed the findings of the interviews, in which the purchasing managers highlighted the importance of this type of training for their suppliers, especially when the turnover of their suppliers' staff is high. However, this provided training is also a mode for knowledge transfer which can contribute to the development of local firms.

Also, Table 7.5 shows that the transfer of knowledge varies among the industrial sectors. In the case of electronics, engineering, and chemical industries, the transfer is more common comparing to the garment industries. The sample of firms that operate in the garment industries show less transfer. For example, in the case of the electrical sector, thirteen out of nineteen (68.4%) of foreign firms provide suppliers with specifications about standard material and components, while five firms out of seventeen (29.4%) for the case of garment industries and thirteen out of thirty one (41.9%) for the chemical industries. These obviously indicate that the transfer of technology varies from sector to sector. In general, transfer by electrical industries is more common, followed by engineering, chemical, and garment industries respectively. It is clearly noticeable that transfer related to product and training is the most frequent type of transfer, while the transfer related to managerial techniques and marketing is very limited.

The findings show that the majority of firms provided assistance related to the product of manufacturing rather than management or marketing transfer. This was expected because it is more important for foreign firms to make sure that the component or parts supplied by local firms fit with the requirements and the specifications needed. Concentrating only on product specifications alone does not promise the development of local firms. Other types of transfer are necessary to develop local firms as well.

However, these findings should be viewed with caution since government regulations differ according to the location of the firm. For example, most of the garment industries are located in the QIZs. The regulations that govern activities of these zones enables industries to enjoy duty-free import of raw materials, component parts, machinery and other equipment required directly in the manufacturing process. These regulations

facilitate the imports of the inputs of the firms; accordingly, this may lead to very low level of backward linkages and then transfer of technology. More than seventy of the firms that make some transfer located inside the industrial estates are governed by different regulations than those governed by firms located inside the QIZs.

7.4.1 Descriptive analysis for independent variables and transfer of technology

This section presents descriptive analysis for the independent variables and the extent of technology transfer. Table 7.6 provides a comparison between the firms that transfer some technology based on the independent variables. These findings will be discussed in the following sub-sections. However, in order to give greater robustness to the results, the differences in the transfer of technology according to the independent variables have been discussed in more detail by using multiple regression to test the hypotheses later in this chapter.

7.4.1.1. Size of the firms and transfer of technology

As stated in chapter 4, the number of employees was used as measurement of firm's size. Table 7.6 provides a comparison of number of employees of firms with frequency of transfer of technology. Percentage wise, as shown in Table 6.7, the percentage of transfer is 25% (5.42/22) for the firms that have more than 214 employees. While the percentage of transfer for the firms that have less than 214 employees it is 16%. Firms that transfer more technology have a higher number of employees. Overall, this generally indicates that the large firms transferred more technology than the small ones.

Such evidence could support the hypothesis that a large subsidiary has a positive impact on the extent on the backward linkages creation process and then the transfer of technology. However, the relationship between size and technology transfer will be further explored later in this chapter.

Table 7.6 comparison between the firms that transfer some technology based on the independent variables

<i>Variables</i>	<i>Number of firms</i>	<i>Frequency</i>	¹ <i>Average</i>	² <i>Percentage</i>
<u>Size (Mean= 214 employees)</u>	-	-	-	
Less than 214 employees	50	176	3.52	16%
More than 214 employees	42	228	5.42	25%
<u>Ownership</u>	-	-	-	
50% or more foreign	50	295	5.90	27%
Less than 50% Foreign	43	103	2.39	11%
<u>Distance</u>	-	-	-	
Majority of the local suppliers located at a distance less than 50 km	36	230	6.39	29%
Majority of the local suppliers located at a distance between 50 and 100 km	41	121	2.95	13%
Majority of the local suppliers located at a distance more than 100 km	16	42	2.62	12%
<u>Age of the Firm (Mean =7.69 year)</u>	-	-	-	
Less than 8 years old	48	166	3.46	16%
8 Years old or more	45	247	5.49	25%
<u>Origin of the firm</u>	-	-	-	
Non Arab Origin	57	380	6.67	30%
Arab Origin	36	32	0.89	4%
<u>Local Sale</u>	-	-	-	
Local sale 50% or more	35	226	6.45	29%
Local sale less than 50%	58	187	3.22	15%
<u>Level of autonomy</u>	-	-	-	
Totally or mostly dependent	41	66	1.60	7%
Totally or mostly independent	52	346	6.65	30%
<u>Type of Industry</u>	-	-	-	
Garment and weaving	17	42	2.33	11%
Chemical	31	112	3.61	16%
Electric and electronic	19	113	5.94	27%
Engineering	26	143	5.5	25%

7.4.1.2 Ownership structure and transfer of technology

In terms of the ownership structure, the firms divided into two main categories: the first category is if the foreign share more than 50 per cent, and the second one is if the foreign ownership is 50 per cent or less. Table 7.6 provides a comparison between the firms that

¹ Since the number of the firms is not equal in each group, it is not possible to compare between the firms based on the total of the assistances provided to their local suppliers. Therefore, in order to calculate the average of transfer we added the number of the assistances provided to the local suppliers for the whole firms that belong to the same group and divided it by the number of firms in that group.

² The percentage calculated here by divided the average of transfer on the number of the type of assistances which is 22 items (See sub-section 4.4.1). Example: for the firms that have less than 214 employees, the percentage calculated as follow: $(176/50=3.52, \text{ then } 3.52/22=16\%)$

transfer some technology based on the ownership structure. As shown in Table 7.6, the percentage of transfer for the firms that belong to the first category (foreign ownership more than 50%) is 27% of the total types of transfer, and 11% for the firms in which the foreign share is 50% or less. This indicates that the transfer of technology increases with the increase of foreign share of the firm.

In previous literature, it has been argued that the degree of foreign ownership of investment projects affects the transfer of technology (Blomstrom and Sjöholm, 1999; Dimelis and Louri; 2002; Javorcik and Spatareanu, 2003). This is due to the fact the majority of foreign ownership increases the incentive for the parent firm to transfer more advanced technology to its affiliate, and then the affiliate transfers this technology to its local supplier. Accordingly, it is expected that the transfer of technology increases with the degree of foreign ownership, making it more possible for spillovers to take place (Ramachandran, 1993).

7.4.1.3 Level of Autonomy and transfer of technology

As mentioned in chapter 4, the level of freedom granted to the affiliate concerning the decision of where to source the inputs could also affect the formation of backward linkages and accordingly the transfer of technology. The respondents were asked to indicate to what extent the firm is independent in its decision of where to source the inputs. According to their response, the firms divided into two groups as shown in Table 7.6. The table shows that the average of transfer for the firms that belong to the first group (Totally or mostly dependent) is 7%, while it is 30% for the second group. However, this result is not surprising because the firms that are restricted by the parent firm in terms of the decision as to where to source the inputs usually rely on the parent firm or on any other sister firm for procurement of its inputs.

7.4.1.4 Market orientation and transfer of technology

It has been argued in the literature that foreign firms that are more focused on the local market establish more relationships with domestic firms, which in turn increases the possibility of spillovers (e.g. Altenburg, 2000). The market orientation in this research

was measured by the per cent of local sale; thus the firms divided into two groups. The first group includes the firms whose sales to local market is 50% or more, while the second group includes the firms whose sales to local market is less than 50%.

As seen in Table 7.6, the percentage of transfer for the firms that focused on the Jordanian market is 29%, while the percentage is 15% for the firms whose sales to local market is less than 50% or focused on the export of their products. This result, however, confirmed the argument of Altenburg (2000); that MNEs more focused on the local market establish more relationships with domestic firms and accordingly increase the potential for the transfer of technology.

7.4.1.5 Type of industries and transfer of technology

As seen in Table 7.6, the percentage of transfer for the firms operating in the garment industry is 11%, while it is 16%, 25%, and 27% for the firms operating in the chemical industries, engineering, and electrical and electronic respectively. This clearly shows that the percentage of transfer varies between the industrial sectors. The firms that operate in the electrical and electronic industries transfer more technology followed by the firms operating in the engineering industries than the chemical industries. The least transfer occurs in the garment industries.

This result could reflect the intensive use of intermediate inputs by MNEs. It has been argued in the literature that the intensive use of intermediate inputs clearly affects the possibility of transfer of technology, especially since this is a significant condition for the occurrence of spillovers through backward linkages (Rodriguez-Clare, 1996).

7.4.1.6 Origins of the firms and transfer of technology

The origin of firms in the survey was divided into two main categories; namely, Arabic origin and non Arab origin, mainly from America, Europe, and Asian. Table 7.6 provides a comparison between the firms that transfer some technology based on the origin of the firm. As shown in Table 7.6 firms from non Arabic origin firms constituted the highest category (61.2%) of the total firms in the sample. The percentage of transfer for this

category is 30%, while the percentage of transfer is only 4% for the firms of the Arabic origin category. It is interesting to note that all firms from non Arabic origin came from relatively more advanced countries, America, Europe, and Asia. On the other hand, MNCs based in developing countries such as Arab countries, transfer less technology. This could be indicative of the countries' stages of industrialisation or attributed to trade agreements with Arab countries. As suggested by Javorcik et al., (2004), preferential trade agreements of which some investor-countries are members are likely to affect the sourcing patterns of foreign affiliates. MNEs of countries excluded from these agreements are likely to prefer a larger share of intermediate inputs sourced by host country suppliers to those that may trade them on preferential terms. In this case, as shown in chapter 3, Jordan has many trade agreements with Arab countries; therefore, such preferential trade agreements may encourage Arab countries to import a larger share of intermediate inputs sourced by home country suppliers. Accordingly, this may affect the creation of backward linkages and transfer of technology.

7.4.1.7 Age of the firm and transfer of technology

Table 7.6 shows that 48 firms had been operating for less than 8 years in Jordan. Table 7.6 shows the differences in years of operation for those that have transferred some technology. The table shows that the older firms transfer more technology than the younger ones. As seen in table 7.4, the percentage of transfer for the firms operating for eight years or more is 25%, while the percentage for the firms operating in Jordan for less than eight years is 16%.

This result indicates that the longer the foreign firms have been in operation in Jordan the more frequently they engage in knowledge transfer activities. This can result from the fact that firms have not been in operation for very long; thus, they have not yet developed their own supply network in Jordan and still depend heavily on imports, whether from their parent or other sister company in their network.

Preliminary findings from this section seemed to suggest that creation of backward linkages requires a relatively long time spent in the country. This was evident in the

average age of firms that operate in the chemical, engineering, and electrical industries over the average age of firms that operate in the garment industry.

7.4.1.8 Geographic proximity and transfer of technology

One of the aims of this research is to find out if the distance between foreign firms and their local suppliers is a matter in technology transfer. However, this research also takes into account the distance between the foreign firms and their local suppliers at the country level. The firms were divided into three groups. The first group includes the firms where the majority of their local suppliers are located at a distance of less than 50 km. The second group includes the firms whose majority of local suppliers is located at a distance between 50 and 100 km. The third group includes the firms where the majority of their local suppliers are located at a distance of more than 100 km. As Table 7.6 indicates, the percentage of transfer for the firms with a majority of the local suppliers located at a distance of less than 50 km is 29%. While its 13% and 12% for the firms who have a majority of the local suppliers located at a distance between 50 and 100 km and the firms who have a the majority of their local suppliers are located at a distance of more than 100 km respectively. This indicates that the firms transfer more technology to their suppliers when positioned closer to the location of the firm. This could be attributed to the fact that closeness between firms' facilitates visits and contacts between the firms.

7.5 Hypothesis testing

It was pointed out in Chapter 4 that this research aims to investigate the relationship between the independent variables and the dependent variable (Transfer of technology). Thus, eight hypotheses were formulated to examine the relationship between the independent variables and the dependent variable. As argued by Javorcik (2007), the knowledge content of the spillover effect is inherently an abstract concept and thus not directly measurable. To measure the extent of technology transfer, this study depends on the responses provided by the respondents to parts of section E of the questionnaire. The extent of technology transfer is calculated through the frequency of the responses of all types of assistances provided to local suppliers (i.e. Technical assistances, managerial assistances, assistance by training, and marketing assistances). The more frequency of

this variable provides an indication that transfer of technology takes place to a greater extent.

In this research, Cronbach's alpha was used to check for levels of reliability. Cronbach's alpha for question E1, 2, 3, and 4 were 0.81, 0.65, 0.72, and 0.70 respectively, indicating acceptable levels of reliability according to (Hair et al., 1998). It was pointed out in Chapter 5 (See section 5.13) that correlation and multiple regressions were utilised in this research to test the hypotheses relating to the contingent variables that may affect the extent of technology transfer. Thus, the current measure of the extent of technology transfer is appropriate for using multiple regression because of its metric nature.

7.6 Dealing with missing data

One of the main common problems that often face researchers is the missing data, and this problem is also associated with other statistical analysis besides multiple regression analysis (Field, 2005). There are many ways of dealing with the problem of missing data as identified in the literature. The first and most simple way is deletion of the cases or variables that have missing data, although this may affect the sample size (Hair et al. 1998). Mean substitution is the second method and is one of the remedial approaches used for solving the problem of missing data (Hair et al. 1998, p.54). This method replaces the missing values for a case or variable with the mean value based on all valid responses. The third method of dealing with missing values is to ignore these values by giving them a specific code (Field, 2005). In this research, to gain more accuracy the researcher decided to ignore the missing values by giving them the code 999.

7.7 Statistical methods used for testing research hypotheses

Several statistical methods were utilised in this research; however, the decision was made to use parametric tests for testing the research hypotheses (see Chapter 5, section 5.13 for an explanation). Eight hypotheses were formulated. Thus, two statistical methods (correlation and multiple regression) were utilised in this research in order to test the research hypotheses. The rationale for utilising correlation and multiple regression methods instead of, for example SEM, to test the hypotheses is due to the limited sample

size ($N = 93$) for the companies who have backward linkages with local suppliers. SEM techniques require a fairly large sample (recommended minimum of 100) for a reliable analysis, which is sometimes hard to obtain in business research. The assumptions of multiple regression analysis are presented in Chapter 5 section 5.13.

7.7.1 Correlation

A correlation is a measure of the linear relationship between variables (Field, 2005, p. 107). With respect to correlation between dependent and independent variables, as table 9.5 shows, the ten independent or predictor variables had a significant correlation with the extent of technology transfer. The garment industry as a dummy variable had a negative correlation and other independent variables had a positive correlation with the extent of technology transfer. However, among all of the predictors, the origin of the firm correlates best with the extent of technology transfer; it has the highest positive correlation with it, which is also significant: ($R = 0.653$ $P < 0.05$). Therefore, it is likely that this variable will best predict and/or explain the variance in the current transfer of technology.

7.7.2 Multiple regression analysis

As mentioned above, multiple regression analysis was conducted in order to test the research hypotheses. It shows how much of the variance in the dependent variable will be explained when several independent variables are theorised to simultaneously influence it. Accordingly, a multiple regression analysis is conducted, by which the independent (predictor) variables are jointly regressed against the dependent (outcome) variable in an effort designed to explain the variance in it. The individual correlations get collapsed into what is called a multiple R or multiple correlations. The square of multiple R is the amount of variance explained in the dependent variable by the predictors. When the R^2 value, the F statistic and its significance level are known, it is possible to interpret the results from a multiple regression analysis (Hair et al. 1998).

Table 7.7 The correlation matrix

		Transfer	Size	Ownership	Distance	Age	Origin	Local sales	Autonomy	Garment	Engineering	Electric
Pearson Correlation	Transfer	1.000	.174	.538	.531	.257	.653	.401	.528	-.217	.178	.185
	Size	.174	1.000	.231	.001	-.315	.483	-.209	.076	.709	-.085	-.175
	Ownership	.538	.231	1.000	.429	-.012	.567	.185	.313	-.058	-.037	.055
	Distance	.531	.001	.429	1.000	.025	.412	.160	.311	-.259	.038	.193
	Age	.257	-.315	-.012	.025	1.000	-.002	.159	.132	-.397	.162	.088
	Origin	.653	.483	.567	.412	-.002	1.000	.177	.464	.147	.019	.128
	Local sales	.401	-.209	.185	.160	.159	.177	1.000	.167	-.505	.227	-.126
	Autonomy	.528	.076	.313	.311	.132	.464	.167	1.000	-.258	.113	.232
	Garment	-.217	.709	-.058	-.259	-.397	.147	-.505	-.258	1.000	-.311	-.246
	Engineering	.178	-.085	-.037	.038	.162	.019	.227	.113	-.311	1.000	-.334
	Electric	.185	-.175	.055	.193	.088	.128	-.126	.232	-.246	-.334	1.000
Sig. (1-tailed)	Transfer	.	.049	.000	.000	.007	.000	.000	.000	.020	.046	.040
	Size	.049	.	.014	.497	.001	.000	.024	.237	.000	.213	.049
	Ownership	.000	.014	.	.000	.454	.000	.040	.001	.291	.365	.301
	Distance	.000	.497	.000	.	.406	.000	.065	.001	.007	.359	.034
	Age	.007	.001	.454	.406	.	.493	.066	.105	.000	.062	.202
	Origin	.000	.000	.000	.000	.493	.	.047	.000	.082	.429	.113
	Local sales	.000	.024	.040	.065	.066	.047	.	.057	.000	.015	.116
	Autonomy	.000	.237	.001	.001	.105	.000	.057	.	.007	.143	.014
	Garment	.020	.000	.291	.007	.000	.082	.000	.007	.	.001	.009
	Engineering	.046	.213	.365	.359	.062	.429	.015	.143	.001	.	.001
	Electric	.040	.049	.301	.034	.202	.113	.116	.014	.009	.001	.

The regression model provides some very significant information about the model: the values of R , R^2 and the adjusted R^2 . Table 9.6 shows that R is the value of the multiple correlation coefficient between the independents or predictors and the outcome. The value of multiple R for this model is 0.833, which is an indication that the model provides a good explanation of the observed values of the outcome variable. R^2 is a measure of how much of the variability in the outcome is accounted for by predictors included in the model (Field, 2005). This value is 0.694, which means the 8 independent variables included as predictors in the model account for 69.4% of the variation in the transfer of technology. The adjusted R^2 provides an idea of how well the model generalises, and

ideally it is better if the value of adjusted R^2 is close to the value R^2 . In the case of this model, the value of adjusted R^2 is 0.655, which is close to R^2 .

Table 7.8 Regression analysis for the independent variables influencing the extent of technology transfer.

Independent variables	Unstandarised coefficients		Standarised coefficients	t-value	Sig.	Tolerance	VIF
	B	Std. Error	Beta				
(Constant)	2.063	.113	-	18.203	.000	-	-
Size	.000	.000	.086	.783	.436	.318	3.150
Ownership	.138	.061	.180	2.245	.028	.594	1.683
Distance	.003	.001	.249	3.294	.001	.669	1.496
Age	.023	.007	.225	3.258	.002	.805	1.242
Origin	.174	.080	.222	2.162	.034	.363	2.751
Local sales	.003	.001	.301	3.604	.001	.551	1.816
Autonomy	.057	.024	.183	2.374	.020	.644	1.553
Garment	.142	.134	.145	1.058	.293	.203	4.932
Engineering	.131	.064	.157	2.034	.045	.642	1.557
Electric	.166	.076	.177	2.201	.031	.589	1.697
R = 0.833							
R² = 0.694							
Adjusted R² = 0.655							
F = 18.108 Sig. 0.000							

The *F-ratio* is a measure of how much the model has improved the prediction of the outcome compared to the level of inaccuracy of the model. In this way, a good model should have a large *F-ratio* (greater than one at least according to Field, 2005, p.150). Table 9.6 shows that the model causes R to change from zero to 0.833, and this change in the amount of variance explained gives rise to an *F-ratio* of 18.108, which is significant ($P < 0.05$). This indicates that the improvement due to fitting the regression model is much greater than the inaccuracy within the model (Field, 2005, p.147).

With respect to multicollinearity, multicollinearity causes a problem for multiple regression because it can affect the parameters of a regression model (Field, 2005).

According to Hair et al. (1998, p.191), there are three recommended methods for assessing multicollinearity:

1. The presence of high correlation (generally 0.90 and above).
2. The tolerance values.
3. The variance inflation factor values.

As shown in Table 7.6, the three tests for multicollinearity showed no high correlation values, the variance inflation factor (VIF) showed no values that exceed the generally accepted maximum level of 10 (an indication of high levels of multicollinearity), and the tolerance values showed no values less than the maximum level of 0.2 (also an indication of high levels of multicollinearity). Therefore, no support was found for the existence of a multicollinearity problem.

With respect to outliers, outliers in the model should be estimated. According to Field (2005), 95% of cases in an ordinary sample are expected to have standardised residuals within ± 2 . In order to check for the outliers to determine if the regression model was biased, standardised residuals and Cook's distance were used. The tests indicated that less than 5% of the sample had no standardised residuals with an absolute value more than 2, which is considered acceptable based on Field (2005). Cook's distance showed no values that exceed the accepted maximum level of 1 (an indication of high level of influential cases). In addition, the Durbin-Watson test was undertaken to test if the residuals were correlated. The test indicated a value of 1.596, which is considered between the acceptable levels (less than 1 or greater than 3 are deemed to be unacceptable) (Field, 2005). Therefore, this study's sample appears to conform to what is expected of a fairly accurate model.

Based on the aforementioned discussion, it can be concluded that the multiple regression model has significantly improved our ability to explain the dependent variable (the extent of technology transfer). The coefficients are referred to as *B* values, which indicate the contribution of each individual predictor to the model. It has been mentioned in chapter seven that the equation of multiple regression takes the following formula:

$$Y = B_0 + B_1X_1 + B_2X_2 + \dots + B_8X_8 + \sum i$$

In this way, the B values inform us concerning the relationship between the current predictors and outcome. The positive value indicates a positive relationship between the predictor and the outcome, whereas a negative coefficient represents a negative relationship. In this sense, B values tell us to what degree each predictor affects the outcome if the effects of all other predictors are held constant.

In this context, t -test is derived to test whether a B value is significantly different from zero. Thus, t -tests are considered as measures of whether the predictor is making a significant contribution to the model based on the level of significance (α). In this research, the traditional level of significance ($\alpha = 0.05$) was adopted. The selection of a critical value also depends on the proposed relationships between variables.

The critical t -values can be expressed based on the type of test. Directional relationships are hypothesised to address the effect of predictors on the extent of technology transfer. Therefore, a one-tailed test of significance was used. For the 0.05 significance level, the critical t -values are above 1.645 for a one-tailed test and above 1.96 for a two-tailed test. For this model, 7 variables emerged as significant predictors of the transfer of technology and 1 variable emerged as non significant, which is size of the firm ($t = 0.783$).

The standardised versions of the B values are, in many ways, easier to interpret because they are not dependent on the units of measurement of the variables. The standardised beta values provided by SPSS and presented in table 9.3 tell us the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor. All of the standardised beta values are measured in standard deviation units and are thus directly comparable. Therefore, they provide a better insight into the importance of a predictor in the model. As shown in table 9.6, local sales has the highest standardised beta value (0.301), indicating that this variable has the highest degree of importance in the model compared with the other predictors.

7.8 Findings from testing the overall hypotheses

The aim of this section is to investigate the relationships between the independent variables and the extent of technology transfer.

7.8.1 Size of the firm

H1: Larger subsidiaries are associated with greater backward linkages with local firms and transfer more technology.

From the results in Table 7.6, the statistics relating to hypothesis 1 reveal that the size of the firm has no significant effect on the extent of technology transfer with a beta of 0.086 (t-value = .783). Thus, the findings of the regression model indicate that hypotheses 1, which predicted a positive direct relationship between firm size and the extent of technology transfer, is not supported at the 0.05 significance level. Therefore, the hypothesis is fully rejected.

This result is consistent with Giuliani (2008), who explored the effect of the size factor in the analysis of the patterns of local knowledge transfer in Costa Rican High-Technologies; however, no significant results was found. In addition, this result is consistent with Tavares and Young (2002) who found no significant relationship between the size of the subsidiary and the input's import propensity.

On the contrary, this result, however, did not support the empirical findings reported by Driffield and Noor (1999), which confirmed that the larger firms transferred more technology than the smaller ones. At the same time, they found that once the variables relating to transaction costs are included, firm size becomes irrelevant.

Interpretations of this contradiction may be provided through seeing firm size measured by the number of the firm's employees. Therefore, this result could be attributed to the fact that most of the large firms located in the QIZs, which enjoy many exemptions for their imports of raw materials and components, lead to a preference for importing most of its input from different countries due to the low cost of these inputs, especially from

China. In turn, this led to weak backward linkages as shown in chapter eight through the interviews with some of the purchasing managers.

7.8.2 Ownership structure

H2: Majority-foreign owned subsidiaries are associated with greater backward linkages with local firms and transfer more technology compared with minority-owned subsidiaries.

To verify if the ownership structure of foreign affiliates affects the transfer of technology to local firms, we have created two measures of foreign presence: firstly, foreign affiliates with 50% or more foreign participation in their capital, and secondly, the remaining foreign affiliates.

The model has confirmed the significant contribution of ownership structure in explaining the extent of technology transfer. Table 7.6 showed that the results of multiple regression in relation to hypothesis 2 reveal that ownership structure has a significant impact on the extent of technology transfer with a beta of 0.180 (t -value = 2.245). Thus, the findings of the regression model indicate that research hypothesis 2, which predicts a positive direct relationship between majority-foreign owned and the extent of technology transfer, is supported at the 0.05 significance level. Consequently, this hypothesis is fully accepted.

The results in Table 7.6 show that transfer of technology of foreign firms with 50% or more ownership have a positive and significant effect on the transfer of technology to domestic firms. This result does not mean that foreign firms with 50% or more ownership have more linkages with domestic suppliers than foreign firms with less than 50% foreign ownership. In our estimation, we do not verify the effect of the intensity of backward linkages on extent of transfer of technology; rather, we consider the effect of ownership on the transfer of technology. This result means that the increase of foreign ownership offers greater opportunities for technology transfer. This may be explained by the fact that the majority of foreign ownership increases the incentive for the parent firm to transfer more advanced technology to its affiliate due to its increased control over the

management. And subsequently the affiliate transfers advanced technology to its local suppliers. In this context, Ramachandran (1993) pointed out that it is expected that transfer of technology increases with the degree of foreign ownership, making it more possible for spillovers to take place.

Furthermore, Smarzynska (2002) tested the hypothesis that transfer of technology associated with partially-owned foreign projects leads to greater transfer than transfer by wholly-owned foreign firms. To test this hypothesis, we take into account the percent of partially-owned foreign firms. If the percent of local ownership is 50 per cent or more it is given 1, otherwise it is given 0. The results show that transfers by backward linkages associated with jointly-owned foreign affiliates firms are positive and significant, whereas the coefficient associated with wholly-owned bear negative signs.

To some extent, this result is associated with the empirical findings reported by Javorcik and Spatareanu (2008), which is based on a foreign firm-level data set. Their results indicate that vertical spillovers are associated with firms with shared domestic and foreign ownership but not with fully owned foreign firms. In addition, this result also coincides with FIAS (2003) which reported that affiliates with shared domestic and foreign ownership offer more technical, managerial and financial assistance to their suppliers than wholly owned subsidiaries.

On the contrary, this result differs from that obtained by Dimelis and Louri (2002) for Greece. They found that the impact of MNEs with minority foreign ownership is clearly greater than those with majority foreign ownership. It is also differs from the result reported by Takii (2005), who uses data for the Indonesian manufacturing sector, and concludes that a greater presence of majority-owned or wholly owned foreign plants reduces the magnitude of spillovers. The findings of Dimelis and Louri (2002) and Takii (2005) could be explained by the fact that wholly-owned, foreign affiliates with greater technological sophistication may require more complex parts and components that could be more difficult for local firms to supply. Thus, the fully-owned foreign affiliates rely

more on imported inputs, and consequently tend to source less locally and hence lead to weak backward linkages and less transfer of technology.

7.8.3 Level of autonomy

H3: More autonomous subsidiaries are associated with greater backward linkages with local firms, and transfer more technology.

Consistent with our expectations, the analysis indicates that the level of freedom granted to the subsidiary is associated with positive transfer to upstream sectors. The model has confirmed the significant contribution of the autonomy in explaining the extent of technology transfer. It was shown in Table 7.6 that the results of multiple regression in relation to hypothesis 3 reveal that autonomy has a significant impact on the extent of technology transfer with a beta of 0.183 (t-value=2.374). Thus, the findings of the regression model indicate that research hypothesis 3, which predicts a positive direct relationship between the level of autonomous and the extent of technology transfer, is supported at the 0.05 significance level. The results suggest that the potential for technology diffusion via vertical linkages depends on the level of autonomy of the subsidiary. A higher level of subsidiary autonomy increases the potential for technology diffusion to local suppliers. Therefore, this hypothesis is fully accepted.

7.8.4 Market orientation

H4: Subsidiaries that primarily sell their product on the local market are more likely to show high transfers of technology than subsidiaries that primarily supply export markets.

The researcher has followed Javorcik (2004) and Smarzynska (2002) in terms of the definition of the export-oriented or local market-oriented. Javorcik (2004) defined export-oriented affiliates as the ones that export more than half of their output. Smarzynska (2002) considered a foreign firm that exports 50 per cent or more of its output as export-oriented firm. On the other hand, firms are considered as local market-oriented if the sale of its output to foreign markets is less than 50 per cent.

Table 7.6 also presents the results of the analysis of the impact of the market orientation of the foreign affiliates on the transfer of technology. We find positive and significant

coefficients between subsidiaries that primarily sell their product on the local market and transfer of technology. This result means that host-oriented affiliates are more likely to report the transfer of technology to local firms of domestic firms than those established with export-oriented affiliates. This result confirms our hypothesis that subsidiaries that primarily sell their product on the local market are more likely to show high transfers of technology than subsidiaries that primarily supply export markets.

As shown in Table 7.6, the statistics relating to hypothesis 4 reveal that local sale of the foreign firms have a significant association with the extent of technology transfer with a beta of 0.301 (t-value = 3.604). Thus, the findings of the regression model indicate that hypotheses 4, which predicts a positive direct relationship between local sale of the subsidiaries and the extent of technology transfer, is supported at the 0.05 significance level. Therefore, the hypothesis is fully accepted. This could be explained by the fact that local market-oriented firms tend to source input and component more than exported-oriented firms. Thus, the intensity of contacts between domestic firms and foreign firms take place, may in turn lead to more technology transfer. However, this result, as shown in table 7.3, supports our fourth hypothesis in which we expected to observe greater technology transfer associated with domestic market-oriented firms.

Our findings confirm the findings of Smarzynska (2002). Smarzynska's data indicate that spillovers take place if backward linkages are associated with domestic market-oriented MNCs but not with those focused mainly on exporting. Smarzynska also found that positive spillover is observed only in connection with partly-owned rather than fully-owned foreign projects. Further, her result confirms the argument of Altenburg (2000): where MNEs that are more focused on the local market establish more relationships with domestic firms, which in turn increase the possibility of spillovers. Furthermore, this result also coincides with Javorcik (2004), who used data for Lithuania, and found some evidence to suggest that FDI projects oriented toward the domestic market generate more spillovers.

On the contrary, Li et al. (2001) conducted a study to distinguish between domestic market-motivated and export-oriented FDI, using Chinese data, and found that domestic firms only benefit in terms of increased efficiency in the case of export-oriented FDI. This result may be due to the fact that, as Javorcik (2004) emphasised, if the requirements imposed by MNEs serving foreign markets are greater, more significant adjustments may be required by local suppliers to meet the requirements of MNEs and will thus increase the potential for spillovers.

7.8.5 Type of Industry

H5: Extent of technology transfer differs according to the industry in which the subsidiary is operating.

The firms who participated in the study were operating in various industries, and the samples allow us to identify the differences in the type of knowledge exchange between firms. The sectoral distribution of the firms in our sample is 18.27%, 33.33%, 27.95%, and 20.43% of foreign affiliates operating in garment, chemicals, engineering, and electrical and electronics respectively.

In respect to the types of industry, we have to use dummy variables since it is not possible to distinguish between these types by using a single variable coded with zero and one. The dummy coding is a way of representing groups or categories using only zero and ones (Field, 2005. p. 206). Therefore, three dummy variables have been created (one less than the number of groups), garment, engineering, electrical and electronics to distinguish the impact of the type of industry on the extent of technology spillovers. The dummy for garment and engineering, electrical firms takes the value one if the type of industry are garment, engineering, and electrical respectively, and zero otherwise; while the chemical industry is given zero as a baseline.

As shown in table 7.6, the statistics relating to hypothesis 5 reveal that Garment industry, as a dummy variable, has no significant effect on the extent of technology transfer compared to chemical industry with a beta of 0.145 (t-value = 1.058). This means that the change in the technology transfer is not predicted for firms from the garment industry

compared to the chemical industry. However, the engineering industry has positive and significant effect on the extent of technology transfer compared to the chemical industry with a beta of 0.157 (t-value=2.034). This indicates that transfer of technology increases more in the engineering industry compared to the chemical industry. The third dummy, for the electric and electronic industry also has a positive and significant effect on the extent of technology transfer compared to the chemical industry with a beta of 0.177 (t-value=2.201). Thus, this actually means that transfer of technology increases more in the electric and electronic industry compared to the chemical industry. Overall, this analysis has shown that compared to chemical industries, engineering and electric industries have positive and significant effect on the extent of technology transfer, but the garment industry does not.

The figures in the regression table confirm the importance of the type of industry on the extent of technology transfer. These figures confirmed hypothesis number 5. Transfer of technology differs according to the industry in which the subsidiary is operating. Thus, this hypothesis is fully accepted. This result is expected as the industries differ in terms of the needed parts and the level of sophistication of parts and component. For example, the needed parts for the electrical industry are differing than the needed parts for the garment industry. However, this result in association with Javorcik (2008), argued that the nature of the relationship between foreign firms and host country firms may depend on the industry in question, the characteristics of the multinational, and the level of sophistication of existing suppliers.

7.8.6 Country of origin

H6: Extent of technology transfer differs according to the country of origin of the subsidiary.

The statistics relating to research hypothesis 6 reveal that the origin of the firm has a significant impact on the extent of technology transfer with a beta of 0.222 (t-value = 2.162). The findings of the regression model indicate that research hypothesis 6, which predicts a positive direct relationship between origin of the firm and the extent of

technology transfer, is supported at the 0.05 significance level. Therefore, the hypothesis is fully accepted.

This result indicates the firms from Europe, America, and Asia transfer more technology to their suppliers compared to firms from Arab countries. In other words, the origin of the foreign firms affects the extent of transfer. The literature on the relationship between origin of the firm and transfer of technology supports these results.

This result may reflect the differences in the level of industrial development between the Arab origin firms and the firms from America, Europe, and Asia. Or as mentioned earlier in this chapter, it may be due to the fact that Jordan has preferential trade agreements with most Arab countries and, as suggested by Javorcik et al. (2004), preferential trade agreements of which some investor-countries are members are also likely to affect the sourcing patterns of foreign affiliates. MNEs of countries excluded from these agreements are likely to prefer a larger share of intermediate inputs sourced from host country suppliers than those that may trade with them on preferential terms. Accordingly, investors from Arab countries may prefer a larger share of intermediate inputs sourced from home country suppliers. Empirically, Javorcik et al. (2004) confirms their suggestion in a study on Romania. This result, however, should be considered together with the findings of Giroud (2003) who reported that the nationality of MNEs influenced the magnitude of vertical knowledge transfer to the Malaysian economy and that newly industrialising economies were transferring relatively less knowledge to their suppliers than did American firms.

However, previous empirical studies found differences in the levels of technologies spillover to local firms. For example, Hu and Jefferson (2002) examine the impact of FDI on electronic and textile sectors in China and found significant differences between the impact of FDI from Taiwan, Macao, and Hong Kong compared to FDI from the OECD countries. The results show that only FDI from OECD countries has a significant effect on the productivity of local firms. Furthermore, in a study of Indian domestic firms,

Banga (2003) found that Japanese MNEs transfer more technology to Indian domestic firms than US MNEs.

Further, Karpaty and Lundberg (2004), based on a panel of data for Swedish manufacturing firms, found that the size of FDI spillover effects depend both on the nationality of the foreign firm and on the absorptive capacity of the domestic firm; they also distinguished between FDI from the USA and the rest of the world. They found that the greatest effect occurs with Japanese FDI. On the contrary, Haskel et al. (2002) did not confirm the positive effect of the Japanese national origin in the UK case.

7.8.7 Age of the firm

H7: Experience of the subsidiaries in the host country is associated with greater backward linkages with local firms, and transfer more technology.

Since it may take time to develop relationships with local suppliers, it is expected that new firms will be less likely to use locally produced inputs than firms with longer experience in the host country and then transfer smaller amount of technologies.

The statistics relating to research hypothesis 7 reveal that the experience of the subsidiary in the host country has a significant impact on the extent of technology transfer with a beta of 0.225 (t-value = 3.258). Thus, the findings of the regression model indicate that research hypothesis 7, which predicts a positive direct relationship between the experience of the subsidiary in host country and the extent of technology transfer, is supported at the 0.05 significance level. This result indicates that the longer the foreign firms have been in operation in Jordan the more frequently they engage in knowledge transfer activities. Therefore, the hypothesis is fully accepted. These results suggest that the differences in behaviour between relatively young and old firms are important as these differences can shed light on changes in the behaviour of subsidiaries over time.

This result coincides with those of Giroud, (2007) and Driffield and Noor (1999), who considered the relation between the length of time spent by foreign firms in the host economy and the transfer of knowledge. Their results confirmed that the longer foreign

firms remain in a host economy, the more they engage in knowledge sharing activities with their local suppliers. Giroud (2007) also reveals this dynamic. First, the change occurred in improvement of capabilities of local suppliers. Second, for foreign firms who have established in host country for a long time, their role and independence within the global network may have increased. Thus, firms have further developed their relationships with their local suppliers.

In addition, this result is consistent with the findings of Belderbos et al. (2000) cited in Javorcik (2008), who find that the proportion of inputs sourced locally by Japanese MNCs increases with the number of years of operation in a given host country. In contrast, Karpaty and Lundberg (2004), using data for the Swedish economy, show that only younger MNEs generate positive spillovers.

7.8.8 Geographic proximity

H8: Decreasing spatial distance between the foreign subsidiary and its local suppliers is associated with more extensive backward linkages and greater extent of technology transfer.

Halpern and Marakozy (2007) revealed that geographic proximity can be important for transfer of technology and knowledge as face-to-face communication and other kinds of personal interaction are important in this process. Thus, different types of knowledge are transferred more effectively by face-to-face communication. Personal relations and face-to-face communication are limited between the employees and managers of distant firms, and may lead to a lower level of knowledge transfer between them. Further, it is likely that firms choose suppliers close to their plants in order to minimise transport costs. As a result, higher transport costs may lead to a lesser probability of establishing supplier-buyer links. Therefore, one of the research aims is to find out if the distance between foreign firms and their local suppliers is a matter in transfer. However, by taking distance into consideration we found positive transfer for domestic firms close to foreign firms located at the country level.

The statistics relating to research hypothesis 8 reveal that the distance between foreign firms and their suppliers in Jordan has a significant impact on the extent of technology transfer with a beta of 0.249 (t-value = 3.294). Thus, the findings of the regression model indicate that research hypothesis 8, which predicts a positive direct relationship of the distance between foreign firms and their suppliers in Jordan has a significant impact on the extent of technology transfer, is supported at the 0.05 significance level. This result indicates that the closer the foreign firms are to their local suppliers the more frequently they engage in knowledge transfer activities. Therefore, the hypothesis is fully accepted. This may be due to the fact that foreign firms operating in the same industrial zone with their suppliers or at the distance of less than 50km facilitate the contact between buyers and suppliers and also does not require high travel or communications costs. Therefore, our findings underline the importance of distance between the firms and its suppliers.

The main theoretical motivation for considering this variable is the importance of face-to-face communication in technology transfer. However, this result should be treated with caution. Since Jordan is a small country, the differences in terms of the distance between the foreign firms and their local suppliers do not vary too much.

7.9 Summary

This chapter has presented the procedures, findings and discussion emerging from the data analysis of this research. The main assumptions of goodness model were checked. This is shown through Durbin-Watson value which is 1.688 and where F yields 18.108. In the regression model there was no collinearity, since tolerance values are less than 1, and VIF less than 10 and more than 1. The normal distributions of variables were also checked by using skewness and kurtosis, where all the variables were normally distributed and the data were screened to check for missing values and outliers.

This Chapter has provided important, various descriptive findings of the survey. The analysis was concerned also with investigating the relationship between the independent variables and the extent of technology transfer represented in the research theoretical model figure 4.1. Correlations and multiple regression were conducted to investigate

these relationships. Based on the related literature, a discussion for each finding was presented in this chapter to justify the logic behind all the results that emerged from the data analysis. A summary and a discussion of the research findings that has emerged from the analysis of quantitative and qualitative data and their implications for theory and practice will be presented in the final chapter.

Chapter Eight

Conclusions and implications

8.1 Introduction

Linkages between MNCs and local industries in host economies have received considerable attention in the literature (e.g. Blomstrom, et al. 2000; Giroud, 2003; UNCTAD, 2001). The impacts of foreign firms on host countries have also been studied carefully in the previous literature. Linkages with local firms have attracted increasing attention from scholars and policy makers due to the role they play in host countries' development, particularly by supporting the local supply industry and transferring technology and knowledge to local suppliers (Giroud, 2007). This support could lead to the upgrading of suppliers through linkages and related technology transfer.

This study is an attempt to provide a better understanding of the transfer of technology in Jordan, as an effort was made to enhance the knowledge regarding how foreign manufacturing companies are supporting their local suppliers and what the assistances provided to local suppliers are. Furthermore, this study has explored the obstacles associated with the formation of backward linkages with local firms.

An examination of the literature indicated that the determinants of the extent of technology transfer vary between researchers. Therefore, the study has expanded the previous work presented in the field of backward linkages and transfer of technology by several researchers since no reliable statement can be made from previous research about the factors that can determine the extent of technology transfer via backward linkages.

This study builds on the works of the aforementioned researchers and develops an accurate and comprehensive view of the extent of technology transfer. It was pointed out in Chapters 1 and 4 that the major objectives of this research were to achieve the following: 1. To determine the extent of local inputs usage by foreign firms operating in the Jordanian manufacturing sector.

2. To identify problems or obstacles that affect the creation of backward linkages with local Jordanian firms. An understanding of these obstacles is important to maximise the benefits of FDI to the Jordanian economy.
3. To ascertain the extent of technology transfer from MNCs to local suppliers through backward linkages in Jordan.
4. To determine the relationship between various independent variables and the extent of technology transfer in Jordan.
5. To highlight relevant policy recommended solutions to the obstacles that affect the creation of backward linkages with local Jordanian firms in order to enhance this process.

To achieve these objectives, a questionnaire survey was performed to quantify the factors of interest and to examine the hypothesised relationships between the independent variables and the dependent variables (i.e. the extent of transfer of technology). In addition, semi-structured interviews were conducted to gain more in depth information.

Descriptive statistical analysis using means and percentages combined with multivariate statistical techniques using correlation and multiple regression were utilised to achieve the objectives of the research. This chapter presents the answers to the research questions based on the major findings emerging from this research arising from the descriptive and statistical techniques. Also, the major contributions of this research to both the academic community and policy makers are presented. In addition, the limitations of this research are outlined, followed by suggestions relating to a future research agenda on the topic.

The answering of the research questions presented in the following sub-sections

8.2 Summary of the research findings.

Two types of results have been reported in this study. First, the descriptive results which show the extent of local inputs usage, the actual obstacles to the creation of backward linkages, and the types of assistances provided to local suppliers (i.e. technical, managerial, marketing and training assistances). Second, the analytical results which show the factors that affect transfer of technology from MNCs to their local suppliers.

The results are presented and discussed in the following sub-sections through answering the research questions to make it easy for the reader.

8.2.1 Formation of backward linkages.

Q1. To what extent does the formation of backward linkages take place between MNCs and local firms in Jordan.

As stated in Chapter 7, local backward linkages were measured by both the number of local suppliers and also as a percentage of total raw materials and components sourced from suppliers based in Jordan.

It has been found that MNCs in the sample engage in low levels of local sourcing of total raw materials and components sourced from suppliers based in Jordan. On other word, this study found that backward linkages with domestic Jordanian firms are very weak, particularly in the garment industries. On average, only about 20 per cent of the inputs processed in Jordan subsidiaries were procured locally in this industry. In spite of the low level of linkages that foreign export-oriented garment industry created with local economy, the export-oriented garment industry, as chapter 7 has shown, has made a significant contribution to the economy in terms of employment and exports.

Furthermore, it has been found also that locally sourced materials and components vary from firm to firm and from sector to sector. As shown in Chapter 7, the average percentage of total raw materials and components sourced from suppliers based in Jordan are 20, 65, and 39 for firms operating in the garment, chemical, and electrical and engineering industries respectively. In terms of the average number of local firms acting as suppliers to MNCs, these are 6, 23, and 15 for firms operating in the garment, chemical, and electrical and engineering industries respectively.

What is interesting, however, is that in spite of the weak backward linkages overall, the firms operating in the chemical, electrical, and engineering sectors established more linkages with local firms, while firms from the garment industries established fewer linkages with local firms. As chapter 7 has shown, this could be attributed to the

regulations that govern the MNCs that operate in the QIZs which facilitate and encourage the import of raw materials and components from outside the country. The regulations of the QIZs enable industries located in these zones to enjoy the duty-free imports of raw materials, components, parts, and machineries and other equipment required directly in the manufacturing process. By considering the age of garment firms, this could be the result of the short period of doing business in Jordan; firms need time to develop their relationships with their local suppliers. In the case of the electronics and engineering, and the chemical industries, these firms have a longer presence in Jordan than in the case of the garment industries; therefore, these firms have more experience in the host country and may already developed their relationships with local firms. Moreover, most of these firms are located in the industrial states or outside; so the regulations that govern their activities vary. The following sub-sections discuss the reasons behind the limited backward linkages with local firms.

8.2.2 The main reasons that hinder the use of local suppliers

Q2. What are the main reasons that hinder the use of local suppliers by MNC subsidiaries in Jordan?

The findings have highlighted some issues related to the development of local suppliers that might explain these limited linkages. The analysis showed that the main obstacles to creating backward linkages with sourcing sectors are the absence of some supplier firms. For example, 85% of the interviewed firms reported that the main reason for relying on imported materials and components was the fact that particular materials and components are not available locally at all.

The second reason or obstacle for not creating backward linkages was the inadequate quality of local firms' products. Numerous MNCs reported that the main reason for using imported inputs was due to the fact that particular inputs were unavailable locally in sufficient quality; in particular, the specialised inputs. This obstacle has been confirmed by 54% of the managers interviewed who cited that the available inputs are not available in sufficient quality. Furthermore, some of the interviewed managers indicated that some of the specialised inputs are unavailable in Jordan at all. Therefore, MNCs

purchase only basic inputs from Jordan and have to purchase the specialised inputs from different countries in which the availability of these inputs are in good quality and at a reasonable price.

The third reason that hinders the use of local suppliers was related to the decision concerning where to buy particular inputs. As shown chapter 7, 38% of the interviewed managers claimed that the decision concerning where to buy particular inputs comes from the headquarters and their role is only to determine the amount needed. In addition, 23% of the interviewees stated that they had other components or supply needs which are more firm specific and sourced from other suppliers within their international supply chains.

The fourth reason that hinders the use of local suppliers was related to the price or cost of the inputs. The interviews revealed that small Jordanian industries simply could not produce garment inputs at competitive prices for the export-oriented garment industry due to the disincentives caused by the economies of scale factor. For example, as the interviews revealed, the domestic value added to the garment industry is low. Most of the fabric and accessories made in Jordan are basic and of low quality. Therefore, fine fabric and complex accessories are mainly imported from China and other countries. Finally, four managers stated that they have the desire to purchase higher quality inputs from abroad.

With respect to the twenty firms that do not have local suppliers at all, the quantitative analysis has shown that the lack of potential local suppliers that match the MNCs capability and quality requirements were the main reason firms did not create backward linkages. This reason was cited by 16 firms (80%). The second reason is the availability of materials and components abroad in competitive quality and cost, this reason was cited by 15 firms (75%). Other factors such as the relatively small scale of production were also cited as a reason for not creating backward linkages.

The creation of backward linkages requires both the availability of components and materials in large quantity with good quality and reasonable prices. Therefore, there is

actual need to develop local suppliers in Jordan as a way of encouraging the formation of backward linkages processes. Government policies that promote local firms' development could be a good policy for creating backward linkages with MNCs. Thus, policy makers in Jordan should stress the need for industrial policies aimed at developing local firms, and then enforcing backward linkages. This could be achieved by supporting local firms financially and encouraging the research and development, for example, by providing local firms with low interest loans or via some kind of tax exemptions.

8.2.3 Extent of transfer of technology

Q3. To what extent does transfer of technology take place from MNCs to local suppliers through backward linkages in Jordan?

This study examines the extent of technology transfer from foreign MNCs to their local suppliers. Our findings provide evidence of some technology transfer from MNCs to their local suppliers in Jordan through backward linkages. The findings have been obtained entirely from enquiring about the perspective of the foreign investing firm. Local firms might report something quite different were they to be invited to participate in this kind of research.

This research revealed that MNCs often provide assistance to their current or prospective suppliers; but only to some of their suppliers, as shown in the interviews, assistance was provided to those whose products were considered as a major input for the final products. This assistance constitutes a knowledge externality. Almost all the interviewed purchasing managers of MNCs reported providing some type of assistance to their local suppliers. As pointed out in chapter 6, some kind of assistance was provided to local suppliers even before a contract was conducted.

In term of the types of assistance, technological assistance, product specification and product design were the main types of assistance provided to local firms, followed by training. On the other hand, financial assistance was the least frequent type provided, followed by management assistance. This finding was not surprising because it is more important for MNCs to make sure that the component or parts supplied by local firms fit

with the requirements and the specifications needed. Other types of transfer are necessary to develop local firms as well. Moreover, it has been found that there are no firms which provide their suppliers with all the types of assistance.

It has been found that 50.5% of MNCs provide suppliers with specifications about standard materials and components. This type of assistance was the major assistance provided. This was followed by the physical or technological specifications of the inputs purchased and technical training in the technology used 46.2% of MNCs provide suppliers with the physical or technological specifications of the inputs purchased, while 39.7% of MNCs provide their suppliers with technical training in the technology used. The training relating to machines, equipment, and technical training in the technology was more frequent than professional training for the suppliers' managers. This may be due to the importance of this type of training to the production operations, and could be attributed to the fact that MNCs basically like to ensure their suppliers are able to produce the parts and components that meet their requirements. These findings of the questionnaire confirmed the finding of the interviews, in which the purchasing managers highlighted the importance of this type of training for their suppliers, especially when a new product, process or new machinery is introduced and also when the turnover of their suppliers' staff is high. However, this training provided is also a mode for knowledge transfer which can contribute to the development of local firms.

Moreover, it has been found that the transfer of knowledge varies among the industrial sectors. The transfer of technology is more common in the case of the electronics, engineering, and chemical industries compared to the garment industries. For example, it has been found that in the case of the electrical sector 68.4% of MNCs provide their suppliers with specifications about standard materials and components, while the percentages are 61.5%, 41.9% and 29.4% in the case of engineering, chemical, and garment industries respectively. These clearly indicate that transfer of technology varies from sector to sector. In general, as shown in section 7.4, transfer by the electrical industries is more common, followed by the engineering, chemical, and garment industries respectively. The most frequent type of knowledge transfer is conducted by the

firms operating in the electrical and engineering industries, while the garment industries have a smaller percentage of firms that engage in these transfers. This is reflected across most of the knowledge transfer activities.

Some MNCs reported that they required the potential suppliers to make certain improvements to their output which were used as inputs for MNCs. In the case of Jordan, it has been found that 69 per cent of the firms interviewed required certain improvements from their suppliers. The most frequent requirements were improvements to the quality of product, reducing the share of defective units produced, purchasing new machineries and equipments to assure quality, increasing production volume. These requirements could enforce local suppliers to improve production on their own. Consequently, to some extent, this will contribute to the development of local firms.

Overall, the analysis of the data shows that little knowledge is being shared by MNCs with local suppliers. For this reason, local suppliers in Jordan do not yet benefit from foreign firms' superior technology and managerial expertise to the extent that the Jordanian government hopes. MNCs purchase only basic inputs from Jordan. Thus, the low level of technology transfer could be attributed to the fact that these basic inputs usually have limited technological content. In this context, Javorcik (2008) pointed out that in such situations there is little scope for knowledge transfer, and upstream benefits may be limited to increasing the demand for inputs and allowing upstream producers to benefit from economies of scale. The benefits of scale economies may be passed on to local input users in other industrial sectors and consequently benefit the whole host economy. However, as stated in Chapter 7, these findings should be viewed with caution since government regulations differ according to the location of the firm.

8.2.4 The main factors that affect the transfer of technology

Q4. What are the main factors that affect the transfer of technology from MNCs to local suppliers in a country such as Jordan?

This study examines the factors that affect the transfer of technology through vertical linkages channels using a firm-level dataset from Jordan. Further, we go beyond the

existing literature by examining and improving our understanding from previous studies by taking into account the type of industries.

Our data shows some indication that domestic market-oriented firms in Jordan tend to transfer more technology to local firms than those focused on exporting. We find that transfers by backward linkages associated with domestic-market-oriented affiliates are positive and significant. The study provides evidence indicating that transfer of technology is associated with MNCs oriented towards supplying the domestic Jordanian market but not in regards to focusing mainly on exporting. The analysis indicated that the presence of domestic market-oriented firms is likely to result in transfer, which is not on the same level of transfer for the FDI projects focused on exporting, which is mainly located in QIZs.

When considering whether the transfer is affected by the level of the autonomy granted to the firms, the analysis showed that firms which enjoy a high level of autonomy in terms of the sourcing of the inputs decision compare favorably to those not enjoying high level of autonomy in terms of the sourcing of the inputs decision.

With regard to the effect of ownership structure, we test the hypothesis that the transfer of technology associated with majority-owned subsidiaries leads to greater transfer than transfer by minority-owned foreign firms. To test this hypothesis, we take into account the percent of partially-owned foreign firms. However, the results suggest that the ownership structure in FDI projects does matter for technology transfer. The analysis indicates that projects with more than 50% foreign ownership is associated with positive transfer to upstream sectors, but no such effect is detected for minority foreign ownership subsidiaries. Transfer through backward linkages associated with majority-owned foreign affiliates firms is positive and significant, whereas the coefficient associated with minority-owned have negative signs.

With respect to the finding concerning the experience or age of the subsidiaries, in order to explore this issue, the firms were divided into two categories. The results seemed to

suggest that transfer of technology requires a relatively long time spent in the host country. This was evident in that subsidiaries which invested in Jordan for more than eight years have transferred more technology to domestic firms than firms which have spent less than 8 years. This result indicates that the longer the subsidiaries have been in operation in Jordan the more frequently they engage in knowledge transfer activities. Transfer by backward linkages associated with the experience of foreign affiliates firms is positive and significant.

The analysis confirmed the significance of the difference in the level of technology transfer depending on whether firms were operating in the garment or the other three industries. Interactions between foreign affiliates and their local suppliers are less developed in the garment industries than in the rest of the firms. The findings reveal that the garment industry has no significant effect on the extent of technology transfer compared to the chemical industry. This means that the change in technology transfer is not predicted by type of garment industry compared to the chemical industry. The engineering industry has positive and significant effects on the extent of technology transfer compared to the chemical industry, which indicates that transfer of technology increases more in the engineering industry compared to the chemical industry. Electrical and electronic industries also have positive and significant effects on the extent of technology transfer compared to the chemical industry. Overall, the analysis has shown that compared to the chemical industries, the engineering and electric industries have positive and significant effect on the extent of technology transfer, but the garment industry does not.

The difference in the knowledge transfer activities between firms, whether or not they are operating in the garment or in the other three industries, could be explained by factors specific to the garment industries, such as the experience of these firms in the host country, the regulations that govern the activities of the firms that operate in QIZs, and the availability of the main inputs of this type in industries. The experience of these firms in Jordan is relatively less than the experience of other firms that operate in other industrial sectors. Thus, the low level of transfer can result from the fact that firms have

not been in operation for very long; and therefore, they have not yet developed their own supply network in Jordan. Moreover, the regulations that govern the activities of the firms operating in QIZs facilitate the import of inputs from abroad. Finally, with respect to the availability of the main inputs, there is a shortage of the garment industry's input in Jordan, in particular the fabric which is considered the main input for this industry.

Our data reveal that the size of the firm has no significant effect on the extent of technology transfer. Transfer through backward linkages associated with the size of foreign affiliate firms is positive but it is not supported at the 0.05 level of significance. This means that bigger firms are less likely to have linkages with local firms. This result could be explained by the fact that most of the large firms located in the QIZs which enjoy many exemptions for their imports of raw materials and components, led to a preference for importing most of their input from different countries due to the low cost of these inputs, especially from China. In turn, this has led to weak backward linkages and the transfer of technology, as shown in chapter nine.

By taking geographic proximity between subsidiaries and the majority of their suppliers into consideration, the findings reveal that there is a positive transfer for domestic firms close to subsidiaries at the country level. Transfer of technology occurs more in the case of closely located firms. In other words, closeness between subsidiaries and their suppliers increases the transfer of technology. This result may contribute to the fact that different types of knowledge are transferred more effectively by face-to-face communication and personal relations and face-to-face communications are limited between the employees and managers of closely located firms. The closeness between firms also facilitates the interactions between firms and makes training or other types of assistance easier.

The statistics relating to the origin of the firms reveal that the origin of the firm has a significant impact on the extent of technology transfer. The findings of the regression model indicate that the origin of the firm has a positive and significant direct relationship with the extent of technology transfer. This result reveals that firms from developed

countries transfer more technology to their suppliers compared to firms that are from developing countries. This result might be explained by the differences in the level of industrial development between the developing countries (Arab origin firms) and firms from America, Europe, and Asia. On the other hand, it could be explained by the fact that Jordan has preferential trade agreements with most Arab countries, and as suggested by Jovorcik et al. (2004), preferential trade agreements of which some investor-countries are members are also likely to affect the sourcing patterns of foreign affiliates. MNEs of countries excluded from these agreements are likely to prefer a larger share of intermediate inputs sourced by host country suppliers than those that may trade with them on preferential terms. Accordingly, investors from Arab countries may prefer a larger share of intermediate inputs sourced by home country suppliers.

Another interesting finding was that most of the firms engaging in transfer of technology were based in the industrialised countries (USA, EU and Asia). Furthermore, the findings suggest that the firms that transfer relatively more technology had a higher number of workers than firms that transfer fewer technologies.

Based on the above findings, we can conclude that firms that made some technology transfer to their suppliers were mostly firms with majority foreign ownership, host market-oriented firms, older firms, firms that enjoy high level of autonomy in terms of the sourcing of the inputs decision, firms operating in the electrical and engineering industries, firms that non Arabic in origin, and firms that are located closer to their local suppliers.

8.3. Implications of the research findings

The important issue for policy makers is whether or not foreign direct investment assists in upgrading the technological capacities of host country firms. The data show that backward linkages and transfer of technology are limited overall. Thus, if Jordan intends to encourage technology transfer to their domestic firms, it needs to encourage the establishment of backward linkages between foreign investors and domestic suppliers, especially in the case of export-oriented affiliates and minority foreign-owned ones.

Since the existing local firms are small-scale, Jordanian government must encourage and support the creation of new industries, new companies, and promotes private investment so as to consolidate the base of the competitiveness of domestic firms. In addition, Jordan needs to support existing local firms by government incentives to improve and expand their production, marketing, and distribution systems. For example, the government can enhance technology transfer through backward linkages by creating a network of competitive local suppliers; this can be achieved by subsidising research and development activity, and the development of human capital. As a result, this can lead to a decrease in the technological gap between subsidiaries and local suppliers and can also increase the confidence of foreign investors in the capacities of domestic suppliers.

In the long term, some of these weaknesses can be reduced and the local firms' technological capabilities increased. Consequently, when the precondition for linkage creation is achieved, the transfer of technology is likely to increase.

Harding and Javorcik's (2007) research revealed that investment promotion efforts in developing countries were an effective way to increase the FDI inflows. They pointed out that if investment promotion is effective it is expected to lead to a greater increase in FDI inflows in priority sectors than in other sectors. They found that sectors clearly targeted by investment promotion agencies in developing countries saw FDI inflows increase following targeting. No such pattern was observed for non targeted sectors during the same period. They conclude that investment promotion is a viable policy option for developing countries that have a sound business environment and wish to attract FDI inflows. Jordan has already established the Jordanian Investment Board for this purpose.

The Jordanian government has to design an effective promotion programme of FDI inflows in order to encourage and induce inward FDI. Furthermore, the government should create a policy, whereby MNEs are not operating under obligatory rules, even though it may be more effective to encourage firms to conduct business in a certain way.

In addition, it is obvious that the volume and nature of inward FDI determine the potential for linkages creation; for this reason, targeting foreign investors with linkage potential can be a part of a general FDI targeting strategy and thus an element in linkage promotion (UNCTAD, 2001, p.173).

Once Jordan promotes its competitive environment and improves the domestic firms' capabilities, the government can design an effective promotion programme of vertical linkages. Furthermore, the government can implement policies targeting knowledge transfer between MNCs and local firms. Eventually, these programmes could strengthen the potential for linkage and technology transfer. However, the individual environment differs significantly and the success of linkage promotion measures can only be achieved when contextually specific conditions and policies are in place (Giroud, 2007, P.173).

8.4 Limitations and further research agenda

As with all management and international business research, this research is subject to a number of limitations and these might be explored in future research. Several limitations were identified.

A disadvantage of our methodology was that, with the data available, we are not able to determine whether the MNCs are purchased from local or foreign-owned suppliers based in Jordan. It was not possible to distinguish Jordanian suppliers from foreign suppliers located in Jordan. In other word, we were not able to capture the nationality of local suppliers (suppliers located in Jordan). Thus, we had to target MNCs with local suppliers; i.e. firms that have suppliers located in Jordan regardless of their nationality. Therefore, our analysis of the extent of technology transfer by covering all locally based suppliers may lead to an overstatement of the contribution of local linkages to local firms. However, since domestically based foreign suppliers also contribute to the development of the local economy, their inclusion in this study is reasonable in economic terms, although caution must be used when interpreting the results.

This study has only considered the MNCs side and has neglected the local firm's side as the data drawn from only MNCs. Taking the local firms into consideration by expanding the study to include the local firms will assist in the determination of the extent to which these assistances contributed to the technological development of local firms. This is among the limitations of this research that needs to be explored in future studies. To determine to what extent this assistance contributed to the technological development of local firms, requires taking the local firms into consideration by expanding the study to include the local firms which needs precise analysis. In this context, Javorcik (2008, p.150) pointed out that in order to understand the impact of multinationals on local suppliers it is necessary to go down to the level of suppliers rather than rely on industry-level information from the input–output matrix. Furthermore, future research should draw the data from both MNCs and indigenous Jordanian suppliers. This will provide more balanced dataset and lead to a more accurate understanding of the research topic (Duanmu and Fai, 2007). Although this study contributes to an improved understanding of factors driving FDI spillover through backward linkages, many questions remain unanswered. In the future, we hope to extend this work to examine the effect on local suppliers. Future research should also involve longitudinal studies to examine the improvement in performance within local companies before and after the receipt of assistance from their MNCs. This is also considered to be appropriate.

Our study used data for four manufacturing sectors. Thus, these results may not be generalisable to other industrial sectors or to the service sector. We cannot, therefore, determine whether there is a positive or negative effect from foreign to indigenous firms evident for the whole manufacturing sector. Future research, however, needs to be extended to other industry sectors in order to generalise the results.

Future research should be extended to include the service sector. As pointed by Javorcik (2008), the most likely source of spillovers to downstream industries may be the service sector, for two reasons. First, almost all formal enterprises use basic services, such as telecommunications and banking; improvements in these sectors are therefore likely to affect all industries. Second, the performance of downstream sectors is attached more

directly to the quality and availability of services supplied by providers operating domestically than it is for physical intermediate inputs. Third, the nature of the service sector and trade barriers limit cross-border trade in services. Thus, opening service industries to foreign providers may form an important channel of spillovers to downstream manufacturing.

There is another shortcoming of our definition of local backward linkages that need to be taken into account when interpreting our results. Our data do not allow us to investigate the quality of the linkage. For example, the potential positive effects from a backward linkage with a domestic supplier of high-tech components might be greater than for a linkage with a supplier of, for example, packaging material.

It has been argued that all multivariate data analysis approaches (e.g. multiple regression) do not actually mean causality between the independent and dependent variables (Hoyle, 1995). Thus, it may be preferable not to draw any fixed conclusions about the directions of relationships because in reality, multivariate data analysis does nothing more than test the relations among the aggregation of the variables as they were assessed. Therefore, these methods cannot overcome the limitations associated with non-experimental data gathered in a single session (Hoyle, 1995).

Although independent variables were identified based on the literature review and the extent of technology transfer were examined, a potential limitation in this study relates to the level of variance explained by the contingent variables (see Chapter 7 for a detailed discussion on the values of R^2 which show how much variance the suggested models explain of the dependent variables). The results of the analytical statistics presented and discussed in Chapter 9 suggest that the presence of the independent variables incorporated in the research theoretical models do not provide a complete explanation of the results. Absent variables are also likely to influence the results. However, there is a need to enlarge the body of available empirical studies, focusing on the factors suggested as possible determinants of FDI spillovers, particularly on the factors with ambiguous results according to the previous research. Similarly, the transfer of technology can vary

from one firm to another; therefore, the future research should consider the cultural differences between the firms. This would include additional factors such as culture (e.g. international culture and business) into consideration when dealing with backward linkages creation and technology transfer would allow for a clearer picture and a better understanding of this phenomenon. This would also contribute to a more appropriate explanation of economic policies aiming to promote FDI. Thus, there is an opportunity for future research to identify and examine the impact of other variables.

The previous studies reveal that the actual impact of FDI varies across the countries due to differences in the size and in the sectoral composition of FDI (Maja et al., 2009). Thus, future research can also be conducted in other developing countries or even in the same countries in the future. This could then introduce different results, since the conditions of the host country and also the behaviour of the MNCs change over time. In this context, Javorcik (2008, p.150) pointed out that if two econometric studies focusing on different countries or the same country in different time periods find seemingly contradictory results, that does not necessarily mean that one study casts doubt on the validity of the other study's methodology or that only one study has uncovered "the true relation." Expectations of MNCs as well as host country conditions may well have changed over time, with each study describing the reality for a given time period.

Furthermore, case studies may be conducted in firms which have successfully created backward linkages and transferred technology to their suppliers to ascertain the factors which have made this possible. Such case studies could also focus on the nature and forms of the business relations in individual firms. This will assist in obtaining a more complete picture; attention should be focused on using more in depth case studies to provide a greater understanding of how and why these companies are providing several types of assistance to their local suppliers. For those companies that have created backward linkages with local firms and then rejected them later for whatever reason, interviews to identify the factors leading to rejection would be of interest. Therefore, future research using case studies that seeks to identify and explain the perceived deficiencies of the questionnaire survey would also be appropriate. However, the

researcher agreed with Crespo and Fontoura (2007, p. 420) who pointed that research on FDI spillovers should move forward from evaluation of the phenomenon at the aggregate level, as conducted by the majority of previous studies. This should take the form of a systematic, detailed analysis of the determining factors of these externalities.

Acknowledging these limitations, our data set allows us to investigate and examine in detail the extent of technology transfer between foreign and domestic suppliers in the four mentioned industrial sectors of Jordan. It also allows us to investigate whether there is a relationship between the independent factors and the extent of technology transfer and to determine the direction of this relation.

8.5 Conclusion

This research has shown that the transfer of technology to domestic firms through backward linkages of MNCs depends on a multiplicity of factors. Some are associated with the characteristics of foreign investment, while other factors are related to the recipient countries, sectors, and firms. Despite the limitations that have been identified in the previous section, this research has provided several important insights into issues relating to backward linkages and transfer of technology. Also, this study is one of the first to examine the impact of several independent variables on the extent of technology transfer in general and in the Arab world particularly. It also contributes to the backward linkages and transfer of technology literature by providing some guidance for future technology transfer research. Hopefully, this research will encourage international business researchers to conduct further empirical studies concerning the transfer of technology to clarify some of the complexity and confusion that is accompanied by previous research findings. Through this research, both researchers and managers will be better able to understand the factors that affect the transfer of technology.

The study adopted multiple approaches to test the research theoretical models. Thus, a personal questionnaire survey was adopted in this research and the researcher was able to question the respondents to ascertain in more details the exact nature of the responses. This study also contributes to the international business literature by examining the

potential exploratory factors that may influence the extent of technology transfer, in particular, the factors with ambiguous results according to the previous research.

Most previous studies of the empirical literature adopted the approach of capturing the effect of the presence of MNCs on the local firms' productivity. We believe that even if some previous studies found an increase in the local firms or labour productivity in the presence of MNCs, it does not necessarily mean that the increase in the local firms' productivity resulted from the presence of the MNCs; this could have resulted from other factors such as an increase in competition between foreign and local firms or could be caused by the efforts made by local firms themselves. In this context, Javorcik (2008, p.150) commented that finding a positive relationship between the change in the presence of multinationals and productivity improvements in the supplying sectors is consistent with the existence of knowledge spillovers, but it does not prove that such spillovers exist, for several reasons. First, in some cases it may attribute to the efforts of suppliers themselves to improve their performance in the hope of receiving contracts from MNCs as the chance of receiving a contract from MNCs induces local suppliers to undertake improvements on their own. Furthermore, as pointed out by Jabbou and Mucchielli (2007), foreign direct investment generates two opposite effects on the intensity of linkages. On the one hand, the entry of MNCs creates new demand for the suppliers of raw materials, processed materials, and intermediate goods. On the other hand, it will increase competition in the host economy; which may require local firms to improve and increase the volume of production.

One of the aims of this research is to contribute to the literature by investigating the relationship between the level of autonomy granted to the subsidiaries and the extent of technology transfer in developing economies; thereby leading to a better understanding of when MNCs contribute to the local firms' development. However, our findings suggest that the subsidiaries autonomy is crucial for the potential developmental impact of MNEs in developing economies. The evidence supports our main argument that the potential of technology transfer via backward linkages depends on the autonomy given to the firm. Therefore, one of the key contributions of this research is to confirm the relationship

between the subsidiary's level of autonomy in its decision concerning the sourcing of its inputs and the transfer of technology to local suppliers in the host country. This result is valuable because it provides us with a better understanding of the role which foreign subsidiaries play in the development of local firms in developing countries, and why their impact might not be as hoped.

Our study also contributed to the literature by confirming that it is unnecessary for frequent knowledge transfer to local suppliers to be associated with the density of backward linkages. Our findings (as illustrated in Table 7.2), revealed that the greatest number of backward linkages forged by the chemical industry, the percentage of total raw materials and components sourced from suppliers based in Jordan, is 65%. On the other hand, the best in terms of transfer of technology (as illustrated in table 9.3), are the firms operating in the electrical industries, despite the percentage of total raw materials and components sourced from suppliers based in Jordan by these firms being less (39%). This indicates that there is no correlation between the density of backward linkages and the density of technology transfer. These findings could lead us to argue that the density of backward and the density knowledge linkages are not necessarily associated.

Furthermore, our study focused on several types of knowledge; technical, marketing, and managerial, whereas most of the previous studies focused specifically on technical knowledge and neglected other types of knowledge, such as marketing and managerial knowledge (e.g. Giuliani, 2008).

Since transfer of technology depends on the level of development of host countries' firms, it is likely that transfer of technology from MNCs differ from country to country. Thus, this emphasises the need for specific studies in specific places. Therefore, future research can extend this study to different host countries.

Our findings reveal that the experience of the subsidiary in the host country has a significant impact on the extent of technology transfer. This result is important as it sheds light on changes in the behaviour of subsidiaries over time. It is reasonable that

subsidiaries with a longer history in the host country have established more knowledge linkages with domestic firms because they have had more time to become embedded in the host economy. Therefore, it could be useful for the government to develop policies that facilitate and allow firms to build long term relationships with MNCs. Government should support and encourage local firms to invest in their internal knowledge resources and innovative capabilities. This could complement policies aimed at bringing in foreign investors and facilitate the creation of backward linkages, and consequently the transfer of technology, particularly for Jordan's case, as the findings reveal that the major obstacle to forming backward linkages is the absence of local firms of some components and the weak quality of local firms' products.

Our findings showed that there are differences in terms of technology transfer according to the industrial sector in which a firm operates, and also according to market orientation. These findings have important policy implications. Therefore, the government should target and attract firms that transfer more technology in order to maximise the benefit of backward linkages.

Our research, however, followed a different approach in which the researcher measured the transfer of technology via several types of knowledge exchange or knowledge sharing between MNCs and their local suppliers, as indicators of technology transfer. Therefore, this approach represents 'true' knowledge transfer, as most of the previous studies adopted the approach of capturing the effect of the presence of MNCs on the local firms' productivity. However, the finding of a positive relationship between the increase in the presence of MNCs and the productivity of supplying sectors does not mean that this increase resulted from the presence of MNCs. Hence, in previous studies it has not been possible to pin down the exact reasons for productivity improvements (productivity increases may be attributable to other factors).

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Appendix A

The Study Questionnaire



University of
HUDDERSFIELD

Dear purchasing manager

I am currently studying for a PhD degree in international business at the University of Huddersfield, United Kingdom. I am undertaking a research project entitled “Transfer of Technology from foreign firms to their local suppliers in manufacturing sector in Jordan through backward linkages”, supervised by Dr. Damian Casserly.

The purpose of the survey is to determine the types of linkages between foreign firms’ subsidiaries operating in Jordan and local suppliers. I would like to find out about the purchasing behaviour of your company, as well as the specific relationships you forged and maintain with your local suppliers. In addition, the research aims to identify the most important factors that might affect the process of forging relationships with local suppliers.

The findings of this research will be very beneficial to your company and local suppliers as well, as your company has competitive advantages linked to the efficiency of its suppliers.

Your response is truly very important to the success of this study. I would like to assure you that your response will be processed as **‘Strictly Confidential’**, and neither firms nor individuals will be named. Your response will be used for academic purposes only, so please try to answer all questions included.

I shall be pleased to share the findings of this research once the study is completed. If you wish to receive a copy of the results, please complete the form on the last page. In closing, I would like to thank you very much in anticipation of your kind co-operation.

I look forward to receiving your reply.

Yours Sincerely,

Taher Alkhatatneh

Introduction

Backward Linkages refer to procurement of goods (including parts, components and materials) that is input directly into the manufacturing process that is purchased in Jordan. For the purpose of this study, the term 'local suppliers' covers all types of local companies providing inputs to your firm irrespective of the types of contractual arrangements, whether it is subcontracting or any other type of contractual arrangement. In addition, we refer to foreign firms in this survey as any firm operating in the manufacturing sector which 10% or more of its ownership is non-Jordanian.

Notice: I will be happy to accept estimates

Section A: Company details

A1. Please, indicate the year in which your subsidiary was first established in Jordan?

A2. Please, indicate the year in which your firm began production in Jordan?

A3. Please, state the country in which the parent firm or the foreign partner of your firm is located.

A4. Please, specify the approximate number of employees currently employed in your company in Jordan.

A5. If your parent firm is a subsidiary of a foreign company, please state the country of origin of the foreign company.

A6. Please, insert the nationality of the general manager of your company.

A7. Please, tick (✓) one or more boxes which describes the main activities of your firm in Jordan

main activities	At time of establishment	Currently
Manufacturing		
Assembly		
Sales and distribution		
Research and Development		
Others, please specify.....		

A8. Please, tick (✓) which of the following types of industries does your firm operate in

- ☐ Garment and weaving industry ☐ Electric and electronic industry
☐ Chemical and Pharmaceutical industry ☐ Engineering industry ☐ Other, please specify.....

A9. Please, tick (✓) which of the following is Currently the ownership configuration of your subsidiary

1	Wholly foreign-owned subsidiary	
2	Majority foreign-owned joint venture	
3	50:50 joint venture	
4	Minority foreign-owned joint venture	

A10. Please, break down the total output by local sales and exports (Percentage of your company's output sold to local market or exports).

Local sales%
Exports%
Total	100%

A11. when establishing the production facility in Jordan, please estimate the percentage of machinery equipment that you purchased locally and the percentage that were imported.

Local purchases%
Imports%
Total%

Section B: Motivations of Initial Investment

The purpose of this section is to obtain information about the reasons behind your initial investment in Jordan.

B1. Using the scale below, please tick (✓) for each reason(s) behind your subsidiary's initial establishment in Jordan

1= Not at all important	2= Unimportant	3= Moderate important	4= Important	5= Extremely important
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Reasons for your subsidiary's initial establishment in Jordan		1	2	3	4	5
1	Local resources available					
2	Use of existing machinery and equipment					
3	Presence of skilled and semi-skilled workforce					
4	Low labour costs					
5	Geographical diversification					
6	Presence of competitors					
7	Good infrastructure					
8	Prior relations with local suppliers					
9	Presence of ethnically close people / acquaintances					
10	Host country economic growth					
11	Large potential domestic market					
12	Strategic location					
13	Favourable government policies towards foreign direct investment (FDI)					
14	Favourable trade agreements					
15	Avoid import restrictions					
16	Political and social stability					
17	Others, please specify.....					

Section C: Inputs Procurement of the Subsidiary

Autonomy of decision in terms of suppliers

C1. Decisions concerning where to source major inputs are normally taken by:

- ☐ Your firm
 ☐ The parent company
 ☐ Another company within the TNC
 ☐ Jointly with parent company or another company within transnational corporation TNC

C2. If the decision is taken jointly with the parent company or another company within TNCs, Please indicate to what extent your company is independent in its decision

1	Company totally dependent on its purchase sourcing	
2	Company mostly dependent on its purchase sourcing	
3	Company mostly independent of its purchase sourcing	
4	Company totally independent of its purchase sourcing	

Section D: Local Suppliers of the Subsidiary

D1. Please, indicate whether your firm has local suppliers (suppliers based in Jordan).

Yes ☐

No ☐

Notice, If you have answered 'No' to question (D1) please answer question (D5) and section F only, If you have answered 'Yes' to question (D1), please ignore question (D5) .

D2. How many local suppliers does your firm have?

D3. Please, estimate the percentage of raw material, parts and components that your company purchase from Jordan.

Evaluation of Local Suppliers

D4. Using the scale below, please indicate overall, how does your firm rate its suppliers' performance in term of the following criteria?

1= Very poor	2= Poor	3=Satisfactory	4= Good	5= Very good
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Criteria		1	2	3	4	5
1	Quality of product					
2	Cost of purchases					
3	Regularity					
4	Delivery time					
5	Rejection rate					
6	Flexibility to new order					
7	Technical competence					
8	Capacity to modernise and improve technical capabilities and quality level					
9	Financial stability of supplier					
10	Others, Please specify.....					

Obstacles for Forging Long-term Linkages

D5. In your view, please tick (✓) which of the following best describes the main obstacles for forging long-term linkages with local firms?

1= To a very small extent	2= To a small extent	3=To a considerable extent	4= To a great extent	5= To a very great extent
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Obstacles for forging long-term linkages		1	2	3	4	5
1	Lack of interest by your company					
2	Lack of interest by local firms					
3	Lack of information on prospective partners					
4	Lack of potential partners that match TNC capability and quality requirements					
5	Lack of financial, technological and training institutions support					
6	No capable local supplier					
7	All inputs supplied by parent firm					
8	Local firms unable to supply large quantity					
9	Parent firm's policy					
10	Local firms are too expensive					
11	Foreign suppliers are more competitive than local suppliers					
12	Others, please specify.....					

D6. Please, indicate the trend in your company's purchases of local inputs since the subsidiary began production.

☐ Decrease ☐ Stay about the same ☐ Increase ☐ Don't know

D7. Please, indicate how do you expect long-term relations with local suppliers to evolve over the next 5 years?

☐ Decrease ☐ Stay about the same ☐ Increase ☐ Don't know

D8. Please indicate the spatial distance between your firm and its local suppliers (please state the percentage of each category)

1	Within 50 kms of your firm%
2	At a distance of between 50 and 100 kms from your firm%
3	At a distance of more than 100 kms from your firm%

Section E: Assistances Provided to Local Suppliers

Technical Assistance

E1. Using the scale below, please indicate whether the following statements apply in your case

1= Never	2= Rarely	3= Sometimes	4= Mostly	5= Always
----------	-----------	--------------	-----------	-----------

Your company provides local suppliers with the following:		1	2	3	4	5
1	Specifications about standard material / component to be delivered (e.g. type, size,...)					
2	Technological specifications					
3	Methods of manufacturing / operational specifications					
4	Product specifications prepared jointly with suppliers					
5	Assistance in product design and development processes					
6	Others, Please specify.....					

Other technological assistances

E2. Using the scale above, please indicate whether the following statements apply in your case.

Your company provides local suppliers with the following:		1	2	3	4	5
1	Assistance in establishing a production plant or on the location of new suppliers' plans					
2	Assistance by supplying machinery, tools, materials, etc...					
3	Assistance in obtaining capital equipment, raw materials and other intermediate products					
4	Assistance in the maintenance of machinery, specialised tools and equipment.					
5	Assistance in technical management					
6	Assistance in factory layout; organisation, etc...					
7	Regular feedback and support to improve existing product and process technology					
8	Others, please specify.....					

Training Assistance

E3. Using the scale above, please tick (✓) on the types of training assistance your firm provides its local suppliers with.

Types of training assistance provided to local suppliers		1	2	3	4	5
1	Professional training for the supplier managers					
2	Operational training to machines and equipment					
3	Technical training in the technology used					
4	Others, please specify.....					

Management, Exporting and Marketing Assistance**E4. Using the scale above, please tick (✓) on whether the following statements apply in your case.**

Statements		1	2	3	4	5
1	Your company gives advice on managerial and organisational issues					
2	Your company gives advice on a whole range of financial and accounting issues					
3	Your company provides assistance with inventory management issues					
4	Your company provides assistance with quality assurance systems (e.g., ISO certification and TQM)					
5	Your company provides information on market characteristics and future investment plans					
6	Your company assists local suppliers in the search for new customers abroad.					
7	Your company provides local suppliers with information on future demand requirements, market trends, etc					
8	Others, please specify.....					

Financial Assistance**Using the scale below, please answer the questions E2, E3, E4, E5, E6 and E7**

1= Never	2= Rarely	3= Sometimes	4= Mostly	5= Always
----------	-----------	--------------	-----------	-----------

E5. please tick (✓) on the types of financial assistance your firm provides its local suppliers with.

Types of financial assistance		1	2	3	4	5
1	Contribution to supplier risk-capital					
2	Loans provided to suppliers					
3	Pre-finance of materials/tools, etc					
4	Payment before delivery					
5	Others, please specify.....					

E6. Please, can you indicate which type of suppliers most often benefit from your company assistance?

- ☐ Assistance mostly provided to locally-owned suppliers
☐ Assistance mostly provided to foreign-owned suppliers
☐ Assistance provided to both local and foreign-owned suppliers

Section F: Personal details**The purpose of this section is to obtain general information related to you as a participant in this research.**

F1	Are you?	<input type="checkbox"/> Male	<input type="checkbox"/> Female
F2	What is your age?	<input type="checkbox"/> Under 25	<input type="checkbox"/> 26- 34 <input type="checkbox"/> 35-44 <input type="checkbox"/> 45 and over
F3	What is your educational level?	<input type="checkbox"/> High school	<input type="checkbox"/> Technical college or equivalent
		<input type="checkbox"/> University Bachelor's degree	<input type="checkbox"/> Master degree or equivalent <input type="checkbox"/> PhD or equivalent
F4	What is your nationality?	<input type="text"/>	
F5	How many years have you been working for this company?	<input type="text"/>	
F6	What is your current position in this company?	<input type="text"/>	
F7	How many years have you been in this position?	<input type="text"/>	

No more questions

Thank you very much for your assistance in completing this questionnaire. If you have any further comments please write below

[illegible]

If you would like to receive a copy of the research findings once the study is completed, please give your name and address below.

[illegible]

Appendix B

Interviews Questions

1. Could you please indicate the year in which your subsidiary was first established in Jordan?
2. Could you please indicate the year in which your firm began production in Jordan?
3. Could you please specify the approximate number of employees currently employed in your company in Jordan?
4. Could you please indicate the type of industries that your firm is currently operating in?
5. Could you please indicate the current ownership configuration of your subsidiary?
6. Could you please break down the total output by local sales and exports?
7. Could you please state the reasons behind your subsidiary's initial establishment in Jordan?
8. Who is the decision maker concerning where to source major inputs?
9. If the decision is taken jointly with the parent company or another company within TNCs, please indicate to what extent your company is independent in its decision?
10. How many local suppliers does your firm have?
11. Could you please estimate the percentage of raw material, parts and components that your company purchases from Jordan?
12. Could you please indicate overall, how does your firm evaluates its suppliers' performance?
13. Could you please state the main obstacles for forging long-term linkages with local firms?
14. Could you please state the types of assistances that your firm provided their suppliers with?
15. Does your firm provide any type of training to its suppliers? If yes which kind of training and how often?

Appendix C

Covering Letter



3 August 2006

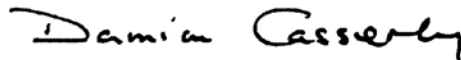
To Whom It May Concern:

Mr Taher Alkhatatneh

Mr Taher Alkhatatneh is currently undertaking research for a PhD at the University of Huddersfield, UK. His study is entitled "Transfer of Technology from Foreign Firms to their Local Suppliers through Backward Linkages"

Part of his research is to conduct interviews with purchasing managers (or their representatives) in foreign firms. I would be very grateful if you would meet him. The information will be used only for scientific research purposes and will be treated as "strictly confidential".

Yours faithfully,



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